Revised Common Framework of CBCS for PBSC w.e.f..2019-20

Table-1: B.Sc.(MSCs) SEMESTER - I

S.NO	Course	Course Code	Part No	Type of the Paper	Total Marks	IA TEST	Sem End Exam	Teaching Hours	Credits
1	English-I	ENGT11A	I	Second Language	100	25	75	4	3
2	Sanskrit-Poetry, Prose and Grammar-I	SANT12	I	First Language	100	25	75	4	3
3	Environmental Studies	AEC002	III	Foundation Course	50	10	40	2	2
4	Communication and Soft Skills-I	AEC003A	III	Foundation Course	50	10	40	2	2
5	Differential Equations	MATT11A	II	Core	100	25	75	6	5
6	Descriptive Statistics & Probability	STAT11	II	Core	100	25	75	4	3
7	Programming in C	CSCT11A	II	Core	100	25	75	4	3
8	Diagrams, Graphs and Descriptive Statistics Lab	STAP11 (Pr)	II	Core	50	10	40	2	2
9	Programming in C Lab	CSCP11A (Pr)	II	Core	50	10	40	2	2

Table-2: B.Sc.(MSCs) SEMESTER - II

S.NO	Course	Course Code	Part No	Type of the Paper	Total Marks	IA TEST	Sem End Exam	Teaching Hours	Credits
1	English-II	ENGT21A	I	Second Language	100	25	75	4	3
2	Sanskrit-Poetry, Prose and Grammar-II	SANT22	I	First Language	100	25	75	4	3

	Revised Common Framework of CBCS for PBSC w.e.f..2019-20								
3	Value Education	**AEC 016**	III	Foundation Course	50	10	40	2	2
4	Computer Fundamentals and Office Tools (ICT-II)	AEC004	III	Foundation Course	50	10	40	2	2
5	Solid Geometry	MATT21A	II	Core	100	25	75	6	5
6	Probability Distributions	STAT21	II	Core	100	25	75	4	3
7	Data Structures	CSCT21A	II	Core	100	25	75	4	3
8	Probability Distributions Lab	STAP21	II	Core	50	10	40	2	2
9	Data Structures Lab	CSCP21A	II	Core	50	10	40	2	2

Table-3: B.Sc.(MSCs) SEMESTER - III

S.NO	Course	Course Code	Part No	Type of the Paper	Total Marks	IA TEST	Sem End Exam	Teaching Hours	Credits
1	Sanskrit-III Drama, Alamkaras and History of Sanskrit Literature	SANT01	I	Second Language	100	25	75	4	3
2	Communication and Soft Skills-II	AEC006	III	Foundation Course	50	10	40	2	2
3	Communication and Soft Skills-III	AEC010	III	Foundation Course	50	10	40	2	2
4	Leadership Education	AEC011	III	Foundation Course	50	10	40	2	2
5	Abstract Algebra	MATT31	II	Core	100	25	75	6	5

	Revised Common Framework of CBCS for PBSC w.e.f..2019-20								
6	Statistical Methods and Theory of Estimation	STAT31	II	Core	100	25	75	4	5
7	Object Oriented Programming using JAVA	CSCT31	II	Core	100	25	75	4	3
8	Statistical Methods Lab	STAP31(Pr)	II	Core	50	10	40	2	2
9	Object Oriented Programming using JAVA Lab	CSCP31(Pr)	II	Core	50	10	40	2	2
Table-4: B.Sc.(MSCs) SEMESTER - IV									
S.NO	Course	Course Code	Part No	Type of the Paper	Total Marks	IA TEST	Sem End Exam	Teaching Hours	Credits
1	English-III	ENGT01	I	First Language	100	25	75	4	3
2	Analytical Skills	AEC007	III	Foundation Course	50	10	40	2	2
3	Entrepreneurship	AEC008	III	Foundation Course	50	10	40	2	2
4	Information and Communication Technology-II	AEC009A	III	Foundation Course	50	10	40	2	2
5	Real Analysis	MATT41	II	Core	100	25	75	6	5
6	Testing of Hypothesis	STAT41	II	Core	100	25	75	4	3
7	Photoshop	CSCT41	II	Core	100	25	75	4	3
8	Parametric & Non- Parametric Distribution Lab	STAP41	II	Core Lab	50	10	40	2	2
9	Computer Science-IV	CSCP41	II	Core Lab	50	10	40	2	2
Table-5: B.Sc.(CaMS) SEMESTER -V									
S.NO	Course	Course Code	Part No	Type of the Paper	Total Marks	IA TEST	Sem End Exam	Teaching Hours	Credits

Revised Common Framework of CBCS for PBSC w.e.f..2019-20
1	Ring Theory and Vector Calculus	MAT T51	II	Core	100	25	75	5	5
2	Linear Algebra	MAT T52	II	Core	100	25	75	5	5
3	Designs of Sample Surveys	STAT51	II	Core	100	25	75	4	3
4	Linear Programming Techniques	STAT52	II	Core	100	25	75	4	3
5	Software Engineering	CSC T51	II	Core	100	25	75	4	3
6	Database Management Systems	CSC T52	II	Core	100	25	75	4	3
7	Designs of Sample Surveys Lab	STAP51 (Pr)	II	Core Lab	50	10	40	2	2
8	Statistical Data Analysis using SPSS and Operations Research-I	STAP52 (Pr)	II	Core Lab	50	10	40	2	2
9	Software Engineering Lab	CSC P51 (Pr)	II	Core Lab	50	10	40	2	2
10	Database Management Systems Lab	CSC P52 (Pr)	II	Core Lab	50	10	40	2	2
Table-6: B.Sc. (CaMS) SEMESTER - VI
S.NO	**Course**	**Course Code**	**Part No**	**Type of the Paper**	**Total Marks**	**IA TEST**	**Sem End Exam**	**Teaching Hours**	**Credits**
1	Numerical Analysis	MAT TEL61	II	Elective	100	25	75	5	5
2	Operations Research	**STA TEL61**	II	Elective A	100	25	75	4	3
3	Applied Statistics	**STA TEL62**	II	Elective B	100	25	75	4	3
4	Actuarial Statistics	**STA TEL63**	II	Elective C	100	25	75	4	3

	Revised Common Framework of CBCS for PBSC w.e.f..2019-20							
5	Statistical Data Analysis using SPSS and OperationsResearch Lab-II	**STA PEL61**	II	Elective Lab	50	10	40	2	2
6	Applied Statistics	**STA PEL62**	II	Elective Lab	50	10	40	2	2
7	Actuarial Statistics	**STA PEL63**	II	Elective Lab	50	10	40	2	2
8	**Operating Systems**	CSCTEL61	II	Elective A	100	25	75	4	3
9	**Web Technologies**	CSCTEL62	II	Elective B	100	25	75	4	3
10	**Computer Networks**	CSCTEL63	II	Elective C	100	25	75	4	3
11	**Operating Systems Lab**	CSCPEL61	II	Elective A	50	10	40	2	2
12	**Web Technologies Lab**	CSCPEL62	II	Elective B	50	10	40	2	2
13	**Computer Networks Lab**	CSCPEL63	II	Elective C	50	10	40	2	2
14	Laplace Transforms and its Applications	MAT TCL61	II	Cluster A	100	25	75	5	5
15	Fourier Series and Fourier Transforms	MAT TCL62	II	Cluster A	100	25	75	5	5
16	Advanced Numerical Analysis	MAT TCL63	II	Cluster A	100	25	75	5	5
17	Discrete Mathematics	MAT TCL64	II	Cluster B	100	25	75	5	5
18	Graph Theory	MAT TCL65	II	Cluster B	100	25	75	5	5
19	Special Functions	MATTCL66	II	Cluster B	100	25	75	5	5
20	Fundamentals of Data Science	CSCTCL 61	II	Cluster A	100	25	75	4	3
21	Big Data Technology	CSCTCL 62	II	Cluster A	100	25	75	4	3
22	Fundamentals of Data Science Lab	CSCPCL61	II	Cluster A	50	10	40	2	2
23	Big Data Technology Lab	CSCPCL62	II	Cluster A	50	10	40	2	2
24	Cloud Computing	CSCTCL 63	II	Cluster B	50	10	40	2	2

	Revised Common Framework of CBCS for PBSC w.e.f..2019-20								
25	Grid Computing	CSCTCL 64	II	Cluster B	100	25	75	4	3
26	Cloud Computing Lab	CSCPCL63	II	Cluster B	50	10	40	2	2
27	Grid Computing Lab	CSCPCL64	II	Cluster B	50	10	40	2	2
28	Mobile Computing	CSCTCL 65	II	Cluster C	100	25	75	4	3
29	Mobile Application Development	CSCTCL 66	II	Cluster C	100	25	75	4	3
30	Mobile Computing Lab	CSCPCL65	II	Cluster C	50	10	40	2	2
31	Mobile Application Development Lab	CSCPCL66	II	Cluster C	50	10	40	2	2
32	Computer Science- Project Work	CSC PWCL63	II	Cluster	100	25	75	2	5
33	Hybrid Operations Research Models	STATCL61	II	Cluster A	100	25	75	4	3
34	Stochastic Operations Research Models	STATCL62	II	Cluster A	100	25	75	4	3
35	Time Series	STATCL63	II	Cluster B	100	25	75	4	3
36	Quality & Reliability	STATCL64	II	Cluster B	100	25	75	4	3
37	Design of experiments	STATCL65	II	Cluster C	100	25	75	4	3
38	Statistical Quality Control	STATCL66	II	Cluster C	100	25	75	4	3
39	Hybrid Operations Research Models Lab	STA PCL61	II	Cluster A Lab	50	10	40	2	2
40	Stochastic Operations Research Models Lab	STA PCL62	II	Cluster A Lab	50	10	40	2	2
41	Time Series	STA PCL63	II	Cluster B Lab	50	10	40	2	2
42	Quality & Reliability	STA PCL64	II	Cluster B Lab	50	10	40	2	2
43	Design of experiments	STA PCL65	II	Cluster C Lab	50	10	40	2	2
44	Statistical Quality Control	STA PCL66	II	Cluster C Lab	50	10	40	2	2
45	Statistics-Project Work	STAPWCL63	II	Cluster Project work	100	25	75	2	5

COMPUTER SCIENCE	CSCPCL61	2018-2019	B.Sc.- -Csc

SEMESTER – VI   **Credits: 2**

Paper-VIII: Elective – II (CLUSTER A – 1)

DATA SCIENCE LAB

1. Create a vector in R and perform operations on it (arithmetic operations, combining vectors, retrieving elements of vector, assign names to vector elements).

2. Create integer, complex, logical, character data type objects in R and print their values and their class using print and class functions.

3. Create a matrix of values in R and extract data from matrix. (Ex. Second row third elements etc) find transpose of matrix and combine two matrices using Rbind and Cbind functions.

4. Create a list in R and perform operations on it like list slicing, sum and mean functions, head and tail functions and finally delete list using rm() function.

5. Create data frame in R and perform operations on it.

6. Import data into R from text and excel files using read.table () and read.csv () functions.

7. Print name of your current working directory and set working directory to your directory in R.

8. Write code in R to find out whether number is prime or not.

9. Print numbers from 1 to 100 using while loop and for loop in R.

10. Create a factor in R by specifying levels. And print it then modify some values in it.

11. Find factorial of a number using recursion in R.

12. Perform arithmetic operations in R using switch case.

13. Create a dataset and draw different types of graphs using plot, boxplot, histogram, stripchart, line functions.

14. Demonstrate Kmeans clustering for any dataset of your choice.

15. Demonstrate Time series for any dataset of your choice

COMPUTER SCIENCE	CSC PCL 62	2017-2018	B.Sc. (MPCS,MECS,MSCA)
	CSC P65	2018-2019	B.C.A.
	CSH P63	2018-2019	B.Sc.-Hons-Csc

SEMESTER – VI   **Credits: 2**

Paper-VIII: Elective – II (CLUSTER A – 2)

Big Data LAB

1. Implement the following Data structures in Java.

    a)Linked Lists b) Stacks c) Queues d) Set e) Map

2. (i)Perform setting up and Installing Hadoop in its three operating modes:

    • Standalone, • Pseudo distributed, • Fully distributed.

    (ii) Use web based tools to monitor your Hadoop setup.

3. Implement the following file management tasks in Hadoop

    • Adding files and directories • Retrieving files • Deleting files Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

4. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

5. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with Map Reduce, since it is semi structured and record-oriented.

6. Implement Matrix Multiplication with Hadoop Map Reduce.

7. Install and Run Hive.

8. Use Hive to create, alter, and drop databases, tables, views, functions and indexes.

9. Use hive to run DML and data retrieval queries.

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COMPUTER SCIENCE	CSCPEL61	2017-18	B.Sc (MPCS, MSCA, MECS)

SEMESTER – VI   **Credits: 2**

Paper-VII(A) – Elective - I

Operating Systems LAB

1. Write c program to implement the Process system calls.

2. Write a 'c' program for I/O system calls.

3. Write the program to implement CPU & scheduling algorithm for first come first serve scheduling.

4. Write a program to implement cpu scheduling algorithm for shortest job first scheduling.

5. Write a 'C' program to perform priority scheduling.

6. Write a program to implement cpu scheduling for Round Robin Scheduling.

7. To implement first fit, best fit algorithm for memory management.

COMPUTER SCIENCE	CSCPEL62	2017-18	B.Sc (MPCS, MECS, MSCA, MSCS)

Semester: VI   **PRACTICAL PAPER**   **Credits: 2**

WEB TECHNOLOGIES LAB

1. Write a html program using ordered list, unorderedlist and nested list.
2. Write a html program using the form components.
3. Develop a Javascript to determine whether the given number is a "PERFECT NUMBER "or not.
4. Develop a Java script to generate "ARMSTRONG NUMBERS" between the ranges 1 to 100.
5. Write a java script that reads an integer and displays whether it is a prime number or not.
6. write a java script which accepts the text in lower case and displays the text in upper case
7. Write a java script to demonstrate two dimensional arrays.
8. Write a java script program for user name and password validation using on click event.
9. Write a jdbc program to insert the records into a specified database by accepting input from keyboard.
10. Write a jdbc program to update the records into a specified database
11. Write a jdbc program to delete the records into a specified database
12. Write a jdbc program to retrieve the records along with column names from a specified database by accepting input from keyboard.
13. Create a jdbc program to call stored procedures using callable statement interface.
14. Write a servlet program to display a "WELCOME" message on the client system.
15. Create a servlet that display the current date and time.

COMPUTER SCIENCE	CSCPWCL63	2017 - 2018	BSC (MPCS/MECS/MSCA)

Semester : VI   **Credits: 2**

PROJECT & VIVA-VOCE

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

COMPUTER SCIENCE	CSC TCL61	2017-18	**B.Sc. (MPCS, MECS, MSCA)**
	CSC T66	2018-19	**B.C.A.**
	CSC T66	2019-20	**B.Sc.-MSCA**
	CSH T62	2018-19	**B.Sc.-Hons-Csc**

SEMESTER – VI   **Credits:3**
                                                                                        Total: 60 Hours
Paper-VIII: Elective – II (CLUSTER A – 1)
Foundation of Data Science

Course Objectives:
1.   To make students familiar with fundamental concepts of data science – process, managing and exploring data.
2.   To provide basic knowledge in modelling methods.
3.   To make students familiar with R – programming
4.   To educate students on graphical analysis and to various plots.
Course Outcomes:
1. Able to apply fundamental algorithmic ideas to process data.
2. Introduction to how to apply hypotheses and data into actionable predictions.
3. Document and transfer the results and effectively communicate the findings using visualization techniques.

UNIT I - Introduction to Data Science   12 Hours
1.1 Data science process
    1.1.1 Roles
    1.1.2 Stages in data science project
1.2 Loading data into R
    1.2.1 Working with data from files
    1.2.2 Working with relational databases
1.3 Exploring data
    1.3.1 Using summary statistics to spot problems
    1.3.2 Spotting problems using graphics and visualization
1.4 Managing data
    1.4.1 Cleaning
    1.4.2 Sampling for modelling and Validation

UNIT II - Modelling Methods   12 Hours
2.1 Choosing and evaluating models
    2.1.1 Mapping problems to machine learning
    2.1.2. Evaluating clustering models
2.2 Validating models
    2.2.1 Identifying Common Model Problems
    2.2.2 Quantifying Model Soundness
2.3 Cluster analysis
    2.3.1 Distances
    2.3.2 Preparing the data
    2.3.3 K – means Algorithm

UNIT III - Introduction to R Language   12 Hours
3.1 Reading and getting data into R
    3.1.1 Viewing named objects
    3.1.2 Types of data items and structure of data items
    3.1.3 Working with history commands
    3.1.4 Saving our working R
3.2 Working with objects
    3.2.1 Manipulating objects
    3.2.2 Viewing objects

      3.2.3 Constructing objects

UNIT IV – Tables & Graphics   **12 Hours**
1.1 Summary tables
      1.1.1 Making contingency tables
      1.1.2 Selecting parts of a table object
      1.1.3 Converting an object into a table
      1.1.4 Testing for table objects
1.2 Manipulating data and extracting components
      1.2.1 creating data for complex analysis
      1.2.2 summarizing data
1.3 Introduction to graphical analysis
      1.3.1 Box-Whisker Plots
      1.3.2 Scatter plots
      1.3.3 Pairs plots
      1.3.4 Line charts
      1.3.5 Pie charts
      1.3.6 Bar charts

UNIT V - Delivering Results   **12 Hours**
5.1 Displaying multivariate data
5.2 Plot () function
5.3 Matrix plots
5.4 Multiple plots in one window
5.5 Exporting graph
5.6 Using graphics parameters

Prescribed Text books:
1. Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.(UNIT I,II)
2. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.(UNIT III,IV.V)

Reference Books:
1. Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
2. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.
3. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, "Practical Data Science Cookbook", Packt Publishing Ltd., 2014.
4. Nathan Yau, "Visualize This: The FlowingData Guide to Design, Visualization, and Statistics", Wiley, 2011.
5. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.

Student Activity:
1. Collect data from any real time system and create clusters using any clustering algorithm
2. Read the student exam data in R perform statistical analysis on data and print results.

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	CSC TCL 62	2017-18	B.Sc. (MPCS,MECS,MSCA)
COMPUTER SCIENCE	CSC T67	2018-19	**B.C.A.**
	CSH T63	2018-19	**B.Sc.-Hons-Csc**

SEMESTER – VI   **Credits: 3**
Paper-VIII: Elective – II (CLUSTER A – 2)

BIG DATA TECHNOLOGY

                                                     TOTAL: 60 hrs

Course Objectives:
1. To learn the concept of big data and analytics.
2. To learn about hadoop and the application of map reduce in hadoop.
3. To learn about different types of nodes present in HDFS.
4. To learn how to write a Mapreduce program and its working.
5. To learn what are the limitations of Mapreduce and how we can overcome these limitations using YARN and the implementation of HievQL.

Course Outcome:
1. Recognize and understand use and applications of big data and analytics. (PO1)
2. Learn how to apply Mapreduce.(PO1)
3. Understand Hadoop ecosystem components. (PO1)
4. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop. (PO1)
5. Able to use Hive as an interface to access data in Hadoop . (PO7)

UNIT-I: **12 hours**
 Introduction to big data: What is Big Data, Structuring Big Data -Types of Big Data, Elements of big data- Volume, Velocity, Variety, Veracity, Big Data Analytics- Advantages of Big Data Analytics, Big Data Applications.

UNIT-II: **12 hours**
Introduction to Hadoop: What is Hadoop, Understanding distributed systems & Hadoop, Comparing SQL databases and Hadoop, Understanding Map Reduce-scaling word count program manually, scaling word count program in Map reduce.

UNIT-III   **12 hours**
Hadoop Eco System, HDFS-HDFS Architecture, concept of blocks in HDFS-namenode, datanode, secondary namenode, job tracker, task tracker). Introducing HBase-HBase architecture, Regions, storing Big Data with HBase, Why hive, pig, scoop, zookeeper, flume, oozie.

UNIT-IV   **12 hours**
Working with files in HDFS-Basic file commands, reading & writing to HDFS programmatically, Anatomy of Map Reduce program-Hadoop data types, Mapper, Reducer, Partitioner, Combiner, word counting with pre-defined mapper and reducer, Reading & Writing-input format, output format.

UNIT-V: **12 hours**
Background of YARN, limitations of map reduce, advantages of YARN, YARN architecture , working of YARN.
Introducing Hive, Hive Services, Hive Variables, Hive Queries, Data types, Hive Built in functions, Hive - DDL, DML, and Data Retrieval Queries.

TEXT BOOKS:
1. BIG DATA (covers hadoop2, map reduce, Hive, Yarn, Pig, R and Data Visualization) Black Book , DreamTech Press. **(Units – 1, 3, 5)**
2. Hadoop in Action by Chuck Lam, DreamTech Press.   **(Units – 2,4)**

REFERENCE BOOKS

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop
Solutions", Wiley, ISBN: 9788126551071, 2015.

2. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.

3. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.

4. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.

5. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.

6. Jy Liebowitz, "Big Data and Business analytics",CRC press, 2013

Student Activity:
1. Collect real time data and justify how it has become Big Data
2. Reduce the dimensionality of a big data using your own map reducer

COURSE CODE: CSCTCL62, CSC T67 & CSH T63   Max. Marks: 75M
CLASS: III B.Sc. (MPCS, MECS, MSCA), III B.C.A. & III B.Sc.-Hons-Csc
Time: 3 Hours

Section-A

ANSWER ANY FIVE QUESTIONS   **5x5M=25M**

1. UNIT -1 --- 5M

2. UNIT -1 --- 5M

3. UNIT -2 --- 5M

4. UNIT -3 --- 5M

5. UNIT -3 --- 5M

6. UNIT -4 --- 5M

7. UNIT -5 --- 5M

8. UNIT -5 --- 5M

Section-B

ANSWER THE FOLLOWING QUESTIONS   **5x10M=50M**

9. UNIT -1 --- 10M
                              OR
   UNIT -1 --- 10M
10. UNIT -2 --- 10M
                              OR
    UNIT -2 --- 10M
11. UNIT -3 --- 10M
                              OR
    UNIT -3 --- 10M
12. UNIT -4 --- 10M
                              OR
    UNIT -4 --- 10M
13. UNIT -5 --- 10M
                              OR
    UNIT -5 --- 10M

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COMPUTER SCIENCE	CSCTEL61	2017-18	B.Sc (MPCS, MSCA, MECS)

SEMESTER – VI

Credits: 3
Total: 60 Hours

Paper-VII(A) – Elective - I
Operating Systems

Course Objectives
1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.

Course Outcomes:
1. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
2. Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.
3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
4. Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.

UNIT – I   **11 Hrs**
Operating System:

    1.1 Introduction
    1.2 Operating Systems Objectives and functions,
    1.3 Computer System Architecture,
    1.4 OS Structure,
    1.5 OS Operations.
    1.6 Evolution of Operating Systems
    1.7 types of operating system
        a)   Simple ,
        b)   Batch,
        c)   Multi programmed,
        d)   time shared,
        e)   Parallel,
        f)   Distributed Systems,
        g)   Real-Time Systems,
        h)   Operating System services.

UNIT – II   **13 Hrs**
Process and CPU Scheduling –
2   Process concepts
    2.1 .a) The Process,
    b)   Process State,
    c)   Process Control Block,
    d)   Process communication.
    2.2 Threads.
    2.3 Process Scheduling
        a)   Scheduling Queues,
        b)   Schedulers,
        c)   Context Switch,
        d)   Pre-emptive Scheduling,
        e)   Dispatcher,
        f)   Scheduling Criteria,
        g)   Scheduling algorithms,
        h)   Case studies: Linux, Windows.
    2.4 Process Synchronization,

a) The Critical section Problem,
b) Synchronization Hardware,
c) Semaphores,
d) Classic Problems of Synchronization,
e) Monitors.

UNIT – III   **13 Hrs**

3 **Memory Management and Virtual Memory** –

3.1 Logical & physical Address Space
3.2 Swapping,
3.3Contiguous Allocation,
3.3 Paging-Structure of Page Table.
3.4 Segmentation,
3.5Segmentation with Paging,
3.6Virtual Memory,
3.7 Demand Paging,
3.8 Performance of Demanding Paging
3.9 Page Replacement
3.10Page Replacement Algorithms,
3.11 Allocation of Frames.

UNIT – IV   **12 Hrs**
4. File System Interface –

4.1 The Concept of a File,
4.2 Access methods,
4.3 Directory Structure,
4.4 File System Mounting,
4.5 File Sharing,
4.6 Protection,
4.7 File System Structure,
4.8 Mass Storage Structure –
a) Overview of Mass Storage Structure,
b) Disk Structure,
c) Disk Attachment,
d) Disk Scheduling.

UNIT – V   **11 Hrs**
5   Deadlocks –
5.1 System Model,
5.2 Deadlock Characterization
5.3, Methods for Handling Deadlocks
5.4 Deadlock Prevention,
5.5 Deadlock Avoidance,
5.6 Deadlock Detection and Recovery from Deadlock.

Textbook
"Operating System Concepts"-Silberschatz, Galvin, Gagne-–eight Edition-John Willey & Sons INC

REFERENCES BOOKS:

 1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press
Student Activity:
1. Load any new operating system into your computer.
2. Partition the memory in your system
3. Create a semaphore for process synchronization.

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE
VIJAYAWADA – 10
MODEL QUESTION PAPER

COURSE CODE: CSCTEL61   **TITLE OF PAPER: OPERATING SYSTEM**
CLASS / GROUP: IIIMPCS/MECS/CAMS   **SEMESTER: VI**
Time: 3 Hrs.   **Max. Marks: 75**
****

SECTION – A

Answer any <u>FIVE</u> questions: **5 X 5 = 25 Marks**

1. UNIT -1 ---   5M
2. UNIT -2 ---   5M
3. UNIT -2 ---   5M
4. UNIT -3 ---   5M
5. UNIT -3 ---   5M
6. UNIT -4 ---   5M
7. UNIT -5 ---   5M
8. UNIT -5 ---   5M

Section-B

ANSWER THE FOLLOWING QUESTIONS   **5x10M=50M**

  9. UNIT -1 --- 10M
                                                            OR
     UNIT -1 --10M
  10. UNIT -2 --- 10M
                                                            OR
     UNIT -2 ---   10M
  11. UNIT -3 --- 10M
                                                            OR
     UNIT -3 --- 10M
  12. UNIT -4 --- 10M
                                                            OR
     UNIT -4 --- 10M
  13. UNIT -5 --- 10M
                                                            OR
     UNIT -5 --- 10M

PARVATHANENI BHRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA – 10

QUETSION BANK

SUBJECT: OPERATINGSYSTEM   CLASS: IIIBSC(MPCS/CAMS/MECS)

COURSE CODE CSCTEL61

UNIT – 1 :- OPERATING SYSTEM

SHORT ANSWER QUESTIONS

 1. WHAT IS AN OPERATING SYSTEM? EXPLAIN THE OBJECTIVES OF   OPERATING SYSTEM.
 2. EXPLAIN COMPUTER SYSTEM ARCHITECTURE.

LONG ANSWER QUESTIONS

 1. EXPLAIN DIFFERENT TYPES OF OPERATING SYSTEMS.

UNIT – 2 PROCESS & CPU SCHEDULING

SHORT ANSWER QUESTIONS

 1. EXPLAIN THE DIFFERNET STATES OF PROCESS.
 2. WHAT IS PROCESS SYNCHORGANIZATION? EXPLAIN BRIEFLY.
 3. WHAT IS CONTEXT SWITCHING?
 4. EXPLAIN ABOUT SEMAPHORES

LONG ANSWER QUESTIONS

 1. EXPLAIN FIFO, STF, PRIORRITY, ROUND ROBIN, SCHEDULING   ALGORITHM WITH AN EXAMPLE.

UNIT – 3 :- MEMORY MANAGEMENT & VIRTUAL MEMORY

SHORT ANSWER QUESTIONS

 1. WRITE ABOUT PHYSICAL & LOGICAL ADDRESS SPACES.
 2. WRITE ABOUT SWAPPING.
 3. WHAT IS CONTIGUOUS MEMORY ALLOCATION?
 4. EXPLAIN SEGMENTATION WITH A NEAT DIAGRAM.
 5. WHAT IS VIRTUAL MEMORY**?**
 6. WHAT IS DEMAND PAGING**?**

LONG ANSWER QUESTIONS :-

 1. EXPLAIN PAGING CONCEPT WITH A NEAT DIAGRAM.
 2. EXPLAIN PAGE REPLACEMENT ALGORITHMS WITH SUITABLE EXAMPLES.

UNIT – 4 FILE SYSTEM INTERFACE

SHORT ANSWER QUESTIONS

1. WRITE ABOUT FILE OPERATIONS.
2. WRITE ABOUT FILE ACCESS METHODS.
3. WHAT IS MOUNTING & SHARING?

LONG ANSWER QUESTIONS

1. WRITE ABOUT FILE ALLOCATION METHODS.
2. WRITE ABOUT DISK SCHEDULING ALGORITHMS.
3. EXPLAIN ABOUT DISK STRUCTURE.

UNIT – 5 DEADLOCKS

SHORT ANSWER QUESTIONS

1. WHAT ARE THE CHARACTERISTICS OF DEADLOCKS?
2. HOW CAN DEADLOCKS CAN BE RECOVERED?

LONG ANSWER QUESTIONS :-

1. EXPLAIN THE METHODS FOR DEADLOCK PREVENTION.
2. EXPLAIN BANKER'S ALGORITHM FOR DEADLOCK AVOIDANCE.
3. EXPLAIN THE METHODS FOR DEADLOCK DETECTION.

COMPUTER SCIENCE	CSCTEL62	2017-18	B.Sc (MPCS, MECS, MSCA, MSCS)

Semester: VI   **Credits: 3**
                                                                 Total Hrs: 60

PAPER: VII (Elective – I.B)
WEB TECHNOLOGIES

Course objective
To provide knowledge on web architecture, web services, client side, server side scripting technologies in focus on the development on web based information systems and web services.

Course outcome
1. To understand web architecture and web services.
2. To design interactive web pages using html and style sheets
3. To practice latest web technologies and tools by conducting experiments

UNIT-1   **10 hrs**
1.1 Introduction to XHTML
1.2 Cascading style sheets
    1.2.1 Inline style sheets
1.2.2 Embedded style sheets
     1.2.3 External style sheets
1.3 Java scripts
    1.3.1 Introduction to scripting
    1.3.2 Control statements
    1.3.3 Functions
    1.3.4   Arrays
    1.3.5   Objects

UNIT-II   **10 hrs**
Dynamic HTML
2.1 Introduction
2.2 Object model and collection
        2.2.1 object model collection
        2.2.2 dynamic style
        2.2.1 frame collection
2.3 Event model
        2.3.1 Onclick and Onload Event
        2.3.2 Mouse Events
        2.3.3 Onfocus and Onblur Event

UNIT-III   **12 hrs**
3.1 XML
    3.1.1 Introduction to xml
    3.1.2 how to write a xml document
    3.1.3 elements and attributes
    3.1.4 comments in xml
    3.1.5 namespace in xml
    3.1.6 xmlcss
    3.1.7 advantages of xml
    3.1.8 uses of xml
    3.1.9 validating xml schema
    3.1.10 data types
    3.1.11 simple types
    3.1.12 complex types

3.2 XSLT
    3.2.1 XSLT introduction
    3.2.2 XSL languages
    3.2.3 XSLT transform
    3.2.4 XSLT <template>
    3.2.5 XSLT <value-of>
    3.2.6 XSLT<for-each>
    3.2.7 XSLT<sort>
    3.2.8 XSLT<if>
    3.2.9 XSLT<choose>

UNIT-IV   **14 hrs**

JDBC
    4.1 Introduction to jdbc
    4.2 How jdbc works
    4.3 Jdbc architecture
    4.4 Jdbc driver types
    4.5 Jdbc connections
    4.6 Jdbc statements
    4.7 Jdbc result sets
    4.8 Jdbc examples
        4.8.1 Create database
        4.8.2 Select database
        4.8.3 Drop database
        4.8.4 Create table
        4.8.5 Drop table
        4.8.6 Insert records
        4.8.7 Select records
        4.8.8 Update records
        4.8.9 Delete records

UNIT-V   **14 hrs**
5.1 Servlets introduction
5.2 How to write servlet
5.3 How to execute servlet
5.4 Life cycle of servlet
5.5 Invoking servlet using Html
5.6 JSF introduction
5.7 Basics of JSF
5.8 Life cycle of JSF

Text Books
1.Web Technologies by A.A.Puntambekar
2.Web Technologies from oxford university press by uttamkumarroy
3.Internet and WWW how to program by Harvey M.deitel and paulJ.deital ,pearson education

Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
VI	MATTCL64	CORE	DISCRETE MATHEMATICS	100	25	75	5	5

Course Outcomes of MATTCL64

S. No	C.O
	Upon successful completion of this course, students should have the knowledge and skills to:
CO1.	Show logical equivalances by using truth tables and rules and to build logical concept.
CO2.	Learn concept related to counting & advanced counting.
CO 3.	Solve counting problems using the principle of inclusion & exclusion.
CO 4.	Define the generating function of a sequences.
CO 5.	Understand the concepts of Boolean algebra & Boolean functions.

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2					H		
CO3						M	
CO4						M	
CO5							L

MATHEMATICS	MAT TCL64	2017 – 18 Onwards	B.A(EMS),B.Sc. (MPC, MPCS, MECS, MSCS)

DISCRETE MATHEMATICS

SEMESTER-VI   PAPER – VIII (B – 1) CLUSTER ELECTIVE   No of Credits: 5

OBJECTIVE: TO ENHANCE THE ANALYTICALSKILLS & APPLICATION SKILLS.

UNIT – I: SETS, FUNCTIONS, RELATIONS AND LOGIC.   (15 hrs)

1.1 Sets and Operations of sets.

1.2 Relations and Functions.

1.3 Fundamentals of Logic.

1.4 Logical Inferences.

1.5 Methods of Proof of an implication.

1.6 First order logic and other methods of proof.

1.7 Rules of inferences for quantified propositions.

UNIT – II: COUNTING PRINCIPLES   (15 hrs)

2.1 Basics of Counting.

2.2 Combinations and Permutations.

2.3 Enumeration of Combinations and Permutations.

2.4 Enumerating Combinations and Permutations with repetitions.

2.5 Enumerating Permutations with Constrained repetitions.

UNIT – III: MATHEMATICAL INDUCTION, PRINCIPLE OF INCLUSION – EXCLUSION

AND MULTINOMIAL THEOREMS.   (15 hrs)

3.1 Mathematical Induction

3.2 The Principle of Inclusion – Exclusion.

3.3 Binomial Coefficients

3.4 The Binomial & Multinomial Theorems.

UNIT – IV: RECURRENCE RELATIONS **(15 hrs)**

4.1 Generating functions of sequences

4.2 Calculation coefficients of generating functions.

4.3 Recurrence relations.

4.4 Solving recurrence relations by substitution and generating functions.

4.5 The method of Characteristic roots.

UNIT – V: BOOLEAN ALGEBRA **(15 hrs)**

5.1 Introduction

5.2 Boolean Algebra

5.3 Boolean Functions

5.4 Switching Mechanisms

5.5 Minimization of Boolean functions.

Prescribed Text book:				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Joe L. Mott, Abraham Kandel, Theodore P.Baker.	Discrete mathematics for computer scientists and mathematics	Prentice – Hall of India Private Limited.	2nd Edition – 2009.

Reference Text book:				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Dr. Swapan Kumar Sarkar.	A Text Book of Discrete Mathematics	S. Chand Publication	2012

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SEMESTER – VI   **Model Paper**   PAPER –VIII (B – 1)   CLUSTER ELECTIVE
COURSE CODE   : MAT TCL64   Time: 3hrs.
TITLE OF THE PAPER   : DISCRETE MATHEMATICS   Max. Marks: 75

Answer any **TEN** choosing at least **THREE** from each section.   **10 x 7.5 = 75 M.**

SECTION – A

1. Let R be the relation on the natural numbers N = {1, 2, 3,……}, defined by "x+2y=10", that

   is, let $R = \{(x, y) / n \in N, y \in N, x + 2y = 10\}.$ Find (a) The domain and range of R.(b) R^{-1}

   (CO 1, L1)

2. Prove that $[(p \wedge \sim q) \rightarrow r] \rightarrow [p \rightarrow (q \vee r)]$ is a tautology.   (CO 1, L 1)

3. Prove or disprove the validity of the following argument:
   Every living thing is a plant or a animal.
   David's dog is alive and it is not a plant.
   All animals have hearts.
   Hence, David's dog has a heart.   (CO1, L 1)

4. When two different dice are rolled, find
   a) In how many ways can we get a sum of 4 or 8?
   b) In how many ways can we get an even sum?   (CO2, L2)

5. Suppose there are 15 red balls and 5 white balls. Assume that the balls are distinguishable and
   that a sample of 5 balls is to be selected.
   a) How many samples of 5 balls are there?
   b) How many samples contain 3 red balls and 2 white balls?   (CO2, L2)

6. Consider the word TALLAHASSEE. How many arrangements are there
   a) Where no two letters 'A' appear together?
   b) Of 4 of the letters taken from TALLAHASSEE?   (CO2, L2)

SECTION – B

7. Use mathematical induction to prove that $1^3 + 2^3 + ... + n^3 = \left[\dfrac{n(n+1)}{2}\right]^2$, whenever 'n' is a

   positive integer.   (CO3, L 1)

8. In a class of 50 students, 20 students play football and 16 students play hockey. It is found that
   10 students play both the games. Find the number of students who play neither football nor
   hockey.   (CO3, L 1)

9. (a) Find the expansion of $(x + y)^6$.

(b) Find the coefficient of $x^5 y^8$ in $(x + y)^{13}$. (CO3, L1)

10. Find the **coefficient of** x^{10} in   a). $\dfrac{1}{(1-x)^3}$ and   b). $\left(x^3 + x^4 + \ldots\ldots\right)^2$ (CO4, L3)

11. Solve the recurrence relations with the given initial conditions a) $a_n = a_{n-1} + 2$; $a_0 = 3$.

b) $a_n = a_{n-1} + n; a_0 = 1$. (CO4, L3)

12. Solve $a_n - 5a_{n-1} + 6a_{n-2} = 0$, *for* $n \geq 2$ and $a_0 = 1, a_1 = -2$, by the generating function. (CO4, L 3)

13. In a Boolean algebra B, for $a, b \in B$, prove that
   a) $a + (a \cdot b) = a$

   b) $a \cdot (a + b) = a$ (CO5 ,L3)

14. State and Prove De'morgan laws in Boolean algebra. (CO5 ,L3)

15. Minimize the switching function $\sum m(0, 2, 8, 12, 13)$. (CO 5,L 3)

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Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
I	MATTCL65	CORE	GRAPH THEORY	100	25	75	5	5

Course Outcomes of MATTCL65

S. No	C.O
	Upon successful completion of this course, students should have the knowledge and skills to:
CO1	Define various types of graphs
CO2	Understand the concept of vertex connectivity and edge connectiviy in graphs
CO3	Evaluate Euler path, circuit and Hamilton paths ,circuits
CO4	Distinguish various types of trees and their properties
CO5	Analyze Prim`s and Kruskal`s algorithms

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2					H		
CO3					M		
CO4							L
CO5						L	

MATHEMATICS	MAT TCL65	2016 – 17 onwards	B.A((EMS)B.Sc(MPC,MPCS,MECS,MSCS)

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS & APPLICATION SKILLS.

Unit I: Graphs and Subgraphs   (15 hrs)

1.1   Graphs, Simple Graph, Multiple Graph, Undirected and Directed graph, degree of vertex, the Handshaking theorem.
1.2   Travelling Salesman problem, types of Graphs
1.3   Subgraphs and Isomorphism of graphs
1.4   Operations of graphs.
1.5   Adjacency and Incidence matrix

Unit II : Connectivity   (15hrs)

2.1 Paths, cycles, connectivity
2.2 Connectedness in undirected graph
2.3 Cut vertex, cutset, bridge
2.4 Connectedness in directed graphs
2.5 Edge connectivity.

Unit III: Eulerian Graphs&Hamilton Graphs   (15hrs)

3.1 **Eulerian graph:** Definitions- Eulerian graph , Eulerian trail, Eulerian Circuit, Euler path
3.2 Theorems on Eulerian graphs – related problems
3.3 Fleury's Algorithm- related problems
3.4 **Hamilton graph:** Definitions-Hamilton circuits, Hamilton path, Hamilton graph
3.5 Theorems on Hamliton graphs- related problems

Unit IV: Trees   (15hrs)

4.1 Trees, properties, distance and centres in trees
4.2 Rooted and binary trees, Spanning tree
4.3 Algorithms for constructing spanning trees- BFS and DFS algorithms
4.4 Cayley's theorem

Unit V : Spanning tree   (15hrs)

5.1 Weighted graph, minimal spanning trees Kruskal's algorithm and Prim's algorithm
5.2 Tree traversal
5.3 Representation of algebraic structure by binary tree

Prescribed Text book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Dr.Swapan Kumar Sankar	A Text Book of Discrete Mathematics	S.Chand& Co.	2012
Reference Text books:				
1.	J.A.Bondy and U.S.R.Murthy	Graph theory with Applications	Mac.Millan Press	Second Edition-2009
2.	Introduction to Graph theory	S.Arumugham and S. Ramachandran	Scitech Publications, Chennai-17	
3.	Graph theory and	H.S. Govinda Rao	Galgotia Publications	
4.	combinations Joe L. Mott, Abraham Kandel, Theodore P.Baker.	Discrete Mathematics for Computer scientists and mathematicians	Prentice – Hall India Pvt.Ltd	

SEMESTER – VI   **Model Paper**   PAPER – VII(B-2)   CLUSTER**ELECTIVE**
COURSE CODE   : MAT TCL65   Time: 3hrs.
TITLE OF THE PAPER   : GRAPH THEORY   Max. Marks: 75

Answer any **TEN** choosing atleast **THREE** from each section.   **10 x 7.5 = 75 M.**

Section A

1. Show that the degree of the vertex of a simple graph G on n vertices cannot exceed n-1
                                                                                    (CO1, L3)
2. Explain Travelling sales man problem.   (CO1, L3)

3. Show that the two graphs shown in the figure are isomorphic   (CO1,L3)
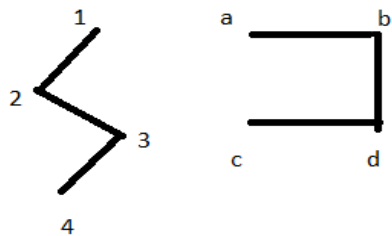
4. If a graph (connected or disconnected) has exactly two vertices of odd degree the show that there must be a path joining these twoi vertices   (CO2,L3)

5. Find the   (CO2,L3)
i) Vertex sets of the components
ii) Cut vertices
iii) Cut edges of the graph given below
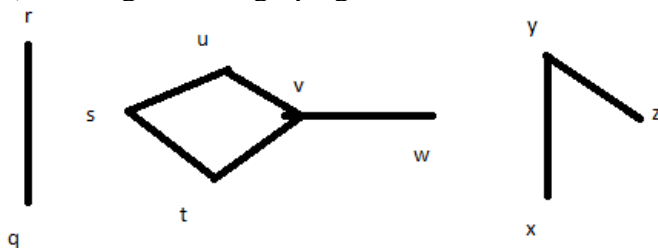
6. Show that the edge connectivity of a graph G cannot exceed the minimum degree of a vertex in G ie., λ (G)$\leq \delta$(G)   (CO2,L3)

Section B

7. Define Eulerian trail, Eulerian circuit, Eulerian path and Eulerian graph. Show that a non empty connected graph G is Eulerian implies its vertices are all of even degree. (CO5,L3)

8. Explain Fleury's Algorithm.   (CO5, L3)

9. Give an example of a graph which is Hamiltonian but not Eulerian and vice versa.(CO5,L3)

10. For any positive integer n, if G is connected graph with n vertices and n-1 edges then G is a tree.   (CO4, L3)

11. Define Spanning tree and show that a simple graph G has a spanning tree iff G is connected.   (CO4, L3)

12. State and prove Cayley's theorem.   (CO4, L3)

13. Define minimal spanning tree and use Kruskal's algorithm to find a minimal spanning tree for the graph   (CO5,L3)
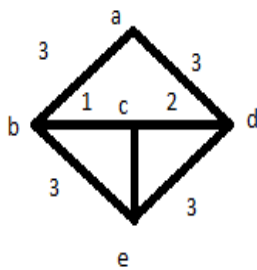
14. Prove that the maximum no. of vertices on level n of a binary tree is 2^n where $n \geq 0$. (CO4, L3)

15. Determine the value of the expression represented in the following binary tree.   (CO5, L3)
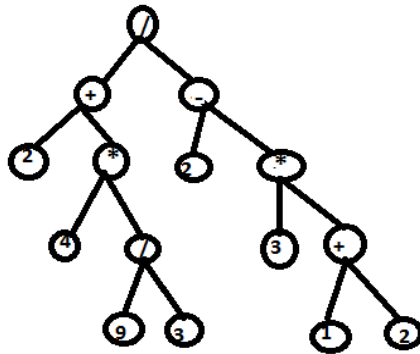
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Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
VI	MATTCL66	CORE	SPECIAL FUNCTIONS	100	25	75	6	5

Course Outcomes of MATTCL66

S. No	C.O	
	Upon successful completion of this course, students should have the knowledge and skills to:	
1.	Understand the Beta and Gamma functions, their properties and relation between these two functions.	
2.	Solve Bessel's equation and write the Bessel's equation of first kind also find the generating function of Bessel's function.	
3.	Solve Legendre equation and write the Legendre equation of first kind, also find the generating function and orthogonal properties of Legendre Polynomials.	
4.	Solve Hermite equation and write the Hermite Polynomial of order 'n' also find the generating function and orthogonal properties of Hermite polynomials.	
5.	Derive Rodrigue's formula, generating function, recurrence relations and orthogonal property of Laguerre polynomials and use them in various applications.	

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2					H		
CO3						M	
CO4							L
CO5							L
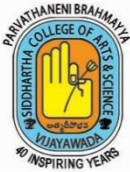
PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE::VIJAYAWADA-10.

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

MATHEMATICS	MAT TCL66	2017 – 18 Onwards	B.A (EMS),B.Sc.(MPC,MPCS,MECS,MSCS)

SPECIAL FUNCTIONS

SEMESTER-VI   PAPER – VIII (B – 3) CLUSTER ELECTIVE   No of Credits: 5

OBJECTIVE: TO ENHANCE THE ANALYTICALSKILLS & APPLICATION SKILLS.

UNIT – I: BETA AND GAMMA FUNCTIONS   (15 hrs)
1.1   - Definition
1.2   - Elementary properties of gamma functions
1.3   - Transformation of Beta functions
1.4   - Another form of Beta and Gamma functions
1.5   - Relation between Beta and Gamma functions
1.6   - Other transformations, important results

UNIT –II: BESSEL'S EQUATION   (15 hrs)
2.1 - Bessel's Equation
2.2 - Definition of J_n(x)
2.3 - Recurrence formula for J_n(x)
2.4 - Generating function for J_n(x)
2.5 – General problems on J_n(x)

UNIT - III: LEGENDRE'S EQUATION   (15 hrs)
3.1 -   Legendre's equation (Def)
3.2 -   Definition of P_n(x)
3.3 -Generating Function.
3.4 -   Orthogonal properties of Legendre's polynomials
3.5 - Recurrence formulae
3.6 -Rodrigue's formula
3.7 - To find first few Legendre's polynomials.

UNIT – IV: HERMITE POLYNOMIALS   (15 hrs)
4.1 – Hermite differential equation
4.2 – Hermite 's polynomials
4.3 – Generating function
4.4 – Other forms for Hermite polynomials
4.5 – Rodrigue's formula
4.6 – To find first few Hermite polynomials
4.7 – Orthogonal properties for Hermite polynomials
4.8 - Recurrence formula for Hermite polynomials

UNIT – V: LAGUERRE POLYNOMIALS **(15 hrs)**

5.1 - Laguerre's differential equation

5.2 - Laguerre polynomials

5.3 - Generating function

5.4 - Other forms for Laguerre polynomials

5.5 - Rodrigue's formula

5.6 - To find first few Laguerre polynomials

5.7 - Orthogonal properties for Laguerre polynomials

5.8 - Recurrence formula for Laguerre polynomials.

Prescribed Text book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	J.N.Sharma&Dr. R.K.Gupta	SPECIAL FUNCTIONS	Krishna Prakashan media (Pvt.Ltd)	2005

Reference Text book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Saran, Sharma &Trivedi	Special functions	PragathiPrakashan	2012

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SEMESTER – VI	**Model Paper** PAPER –VIII (B – 3)	**CLUSTER ELECTIVE**
COURSE CODE	: MAT TCL66	Time: 3hrs.
TITLE OF THE PAPER	: SPECIAL FUNCTIONS	Max. Marks: 75

Answer any **TEN** choosing at least **THREE** from each section.   **10 x 7.5 = 75 M.**

SECTION – A

1. When n is a positive integer prove that 2^n $\Gamma(n+\frac{1}{2}) = 1.3.5\ldots\ldots\ldots(2n—1)\sqrt{\Pi}$. (CO1, L1)

2. Prove that $\beta(1, m) = \frac{\Gamma(l)\Gamma(m)}{\Gamma(l+m)}$.   (CO1, L1)

3. State and prove Legendre's Duplication formula.   (CO1, L1)

4. State and prove Generating function for $J_n(x)$.   (CO2, L2)

5. Prove that $2J_n'(x) = J_{n-1}(x)$ -- $J_{n+1}(x)$.   (CO2, L2)

6. Prove that $\sqrt{(\frac{\Pi x}{2})}$ $J_{\frac{3}{2}}(x) = \frac{1}{x}\sin x – \cos x$.   (CO2, L2)

SECTION – B

7. State and prove orthogonal properties for Legendre's polynomials.   (CO3, L3)

8. Prove that $(2n+1)$ $xP_n(x) = (n+1)P_{n+1}(x) + n\ P_{n-1}(x)$.   (CO3, L3)

9. State and prove Rodrigues formula for Legendre's Equation.   (CO3, L3)

10. State and Prove Generating function for Hermite Polynomials.   (CO4, L4)

11. Prove that $H_n(x) = 2^n [\exp(-\frac{1}{4}\frac{d^2}{dx^2})\ x^n]$.   (CO4, L4)

12. Prove that (i) $H_{2n}(0) = (-1)^n \frac{(2n)!}{n!}$.   (ii) $H_{2n+1}(0) = 0$.   (CO4, L4)

13. State and Prove Generating function for Laguerre polynomials.   (CO5, L4)

14. Prove that $(n+1)\ L_{n+1}(x) = (2n+1-x)\ L_n(x) – n\ L_{n-1}(x)$.   (CO5, L4)

15. Prove that $L_n(x)\ = \frac{e^x}{n!}\frac{d^n}{dx^n}(x^n e^{-x})$.   (CO5, L4)

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Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
VI	**MATTEL61**	CORE	Numerical Analysis	100	25	75	5	5

Course Outcomes of MATTEL61

S. No	C.O Upon successful completion of this course, students should have the knowledge and skills to:	
1.	Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.	
2.	Apply various interpolation methods and finite difference concepts.	
3.	Apply numerical methods to obtain approximate solutions to mathematical problems.	
4.	Analyse and evaluate the accuracy of common numerical methods.	
5.	Find the roots of algebraic and transcendental equations.	

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					M		
CO2					M		
CO3						M	
CO4							L
CO5							L

MATHEMATICS	MATTEL61	2017 – 18 Onwards	B.A (EMS),B.Sc.(MPC,MPCS,MECS,CAME,CAMS,MSCS)

NUMERICAL ANALYSIS

SEMESTER-VI   **PAPER – VII (ELECTIVE)**   **No of Credits: 5**

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATION SKILLS.

UNIT-I: FINITE DIFFERENCES & INTERPOLATION WITH EQUAL INTERVALS (15Hrs)

1.1. Introduction of finite differences, Formulae, Operator Δ, ∇, E and differences tables.
1.2. Fundamental theorem of difference calculus.
1.3. Missing terms and Factorial notation.
1.4. Differences of zeros.
1.5. Newton forward interpolation formula, theorem and related problems.
1.6. Newton backward interpolation formula, theorem and related problems.

UNIT-II : INTERPOLATION WITH UNEQUAL INTERVALS   (15 hrs)

2.1. Divided differences, Properties and Related problems.
2.2. Relation between divided differences, Forward, Backward and Central difference.
2.3. Newton's divided difference theorem and related problems.
2.4. Lagrange's interpolation with unequal intervals theorem and related problems.

UNIT-III : CENTRAL DIFFERENCE INTERPOLATION FORMULAE   (15 hrs)

3.1. Gauss's forward difference formulae and problems.
3.2. Gauss's backward difference formulae and problems.
3.3. Stirling's central difference formulae and problems.
3.4. Bessel's formulae and problems.
3.5. Everett's formulae and problems.

UNIT-IV: INVERSE INTERPOLATION   (15 hrs)

4.1. Introduction.
4.2. Lagrange's Method and related problems.
4.3. Successive Approximation Method and related problems.

UNIT-V: SOLUTION OF ALGEBRAIC AND TRANSCEDENTAL EQUATIONS (15 hrs)

5.1. Bisection Method and related problems.
5.2. Iteration Method and related problems.
5.3. False Position Method and related problems.
5.4. Newton Raphson Method and related problems.

Prescribed Text book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	S.S Sastry	Numerical Analysis	Prentice Hall of India Private Limited	1999

Reference Text books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Gupta & Malik	Calculus of finite differences and Numerical analysis	Krishna PrakasanMandir - Merrut New Age International Publishers.	1999
2.	G.Shankar Rao	Numerical analysis	PragatiPrakashan.	2010
3.	Dr. D. Chitti Babu	Numerical analysis		2009

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SEMESTER – VI   **Model Paper**   **PAPER – VII (ELECTIVE)**

COURSE CODE   : MAT TEL61   Time: 3hrs.
TITLE OF THE PAPER   : NUMERICAL ANALYSIS   Max. Marks: 75

Answer any **TEN** choosing at least **THREE** from each section.   **10 x 7.5 = 75 M.**

SECTION –A

1. State and prove the fundamental theorem of difference calculus.   (CO1, L2)

2. State and prove Newton's – Gregory forward formula for interpolation. (CO1, L2)

3. By using Newton's backward interpolation formula, find the value of tan17° from the following data.   (CO1, L2)

θ	0°	4°	8°	12°	16°	20°	24°
$\tan\theta$	0	0.0699	0.1405	0.2126	0.2867	0.3640	0.4452

4. If f(x) = $\frac{1}{x^2}$, find the divided differences *f(a ,b), f(a, b, c)* and *f(a, b, c, d).* (CO2, L2)

5. State and prove Newton's divided difference formula.   (CO2, L2)

6. Find the polynomial of the lowest possible degree from the given data by Lagrange's formula.   (CO2, L2)

x	-4	-1	0	2	5
y	1245	33	5	9	1335

SECTION – B

7. State and prove Gauss Forward interpolation formula.   (CO3, L2)

8. Use Stirling's formula to find y_{28} , given $y_{20} = 49225$, $y_{25} = 48316$, $y_{30} = 47236$, $y_{35} = 45926$, $y_{40} = 44306$.   (CO3, L2)

9. Given, $y_{20} = 24$, $y_{24} = 32$, $y_{28} = 35$, $y_{32} = 40$, find y_{25} by Bessel's formula. (CO3, L2)

10.Apply Lagrange's formula inversely to find , to once decimal place, the value of *x* when *y = f(x)= 13.6,* given the following table.   (CO4, L4)

x	30	35	40	45	50
F(*x*)	15.9	14.9	14.1	13.3	12.5

11. The following values of y = f(x) are given

x	10	15	20
f(x)	1754	2648	3564

Find the value of x for f(x) = 3000 by successive approximation method.   (CO4, L4)

12. Find the real root of the equation $x^3 + x - 3 = 0,$ which lies between 1.2 and 1.3.
(CO4, L4)

13. Find the real root of the equation $F(x) = x^3 + x^2 - 1 = 0,$ by using Iteration method.
(CO5, L4)

14. The equation $x^6 - x^4 - x^3 - 1 = 0$ has one real root between 1.4 and 1.5. Find the root
to four places of decimal by false position method.   (CO5, L4)
.
15. Find the real root of the equation $x^2 + 4sinx = 0$ correct to four places of decimal by
using Newton's- Raphson method.   (CO5, L4)

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STATISTICS   STAPCL61   2018-19   B.Sc. Hons
SEMESTER – VI   Practical -IV   No. of credits: 2
Statistical-Data Analysis using SPSS and Operations Research

CourseOutcomes		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	**Programme OutcomesMapping**
CO 1	SPPS syntax with some basic notions for developing their own simple programs and visualizing graphics in SPSS	PO6
CO 2	SPSS Syntax to test the normality and correlation and regression techniques	PO6
CO3	Simplex method of solving linear programming problem (LPP) for finding unbounded, alternate and in feasible solutions	PO5
CO 4	Determine the optimal solution for trasportation and assignment problems.	PO5
CO 5	Construction of the PERT Network and Calculation of expected completion time for the project using critical path method	PO5

CO-PO MATRIX								
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
STAPCL61	**CO1**						H	
	CO2						H	
	CO3					M		
	CO4					M		
	CO5					L		

Data Analysis using SPSS

1. Descriptive Statistics- frequency Tables, Central Tendency, Dispersion, Skewness and Kurtosis

2. Visual Statistics :   Bar diagrams, Histogram and Pie- diagram

3. Correlations & Regressions

4. Testing of Hypothesis: Normal test, t-test, Chi-square test and F- test

Operations Research

5. Optimum Solution of LPP by using Simplex Method

6. Optimum solution of Transportation problems (Minimization & Maximization)

7. Optimum solution of Assignment Models (Minimization & Maximization)

8. Project Management : To Construction the PERT network, calculation of expected completion time for the project using Critical path method and To determine the probability that project is completed within specified time.

1. Refference books for SPSS:
   (i)   SPSS Base 11.0 User's Guide, Bangalore, India
   (ii) STATISTICS: CONCEPTS AND APPLICATIONS, PAL, NABENDU, SARKAR, SAHADEB   Edition: Second Edition, Publication: PHI Learning, New Delhi - 110 001, India.
2. Refference books for Operations Research:
   (i)   Operations Research: Kanti Swaroop, P.K.Gupta and ManMohan, Sultan Chand & Sons
   (ii) Operations Research: S.D.Sharma , Kedar nath Romnath & Co.Meerut.

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PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &
SCIENCEVIJAYAWADA - 520 010

An Autonomous College in the jurisdiction of Krishna University,
Machilipatnam, Krishna District, Andhra Pradesh, India

STATISTICS   **STAPCL62**   2017-18   B.A(EMS)/B.Sc.(M.S.CA)

SEMESTER – VI   No. of credits: 2

Stochastic Operations Research Models- Practical- IX

TITLE OF THE COURSE : STOCHASTIC OPERATIONS RESEARCH MODELS COURSE CODE: STATCLP 62		
COURSE OUTCOME	**COURSE OUTCOME -III BA /MSCS/CAMS**	**PROGRAM OUTCOME**
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO_1	Implement practical cases in game theory by using LPP method	PO7
CO_2	Implement practical cases in game theory by using Algebraic method	PO7
CO_3	Implement practical cases in game theory by using Graphical method	PO7
CO_4	Solve the queuing problems based on the Model (M/M/1):(/FIFO)	PO5
CO_5	Solve the queuing problems based on the Model (M/M/1): (N/FIFO)	PO5

CO-PO MATRIX								
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
STAPCL62	CO1							H
	CO2							H
	CO3							H
	CO4					M		
	CO5					M		

I	To solve game problem by using LPP method -		2 experiments
II	To solve game problem by using Algebraic Method		2 experiments
III	To solve the game problems using graphical method		2 experiments
IV	To solve the queuing problems based on the Model (M/M/1):(∞/FIFO)		2 experiments
V	To solve the queuing problems based on the Model (M/M/1): (N/FIFO)		2 experiments

Text Book: 1.   Operations Research Theory, Methods and Applications, S.D. Sharma, HimanshuSharma, improved and enlarged edition(16th revised), 2009 KedarNathRamNath& Co., Meerut

2.   KantiSwarup, P.K.Gupta , Man Mohan,Operations Research, 15th Edition, 2010, Sultan Chand & Sons, New Delhi.

Structure of Practical Paper-VIII

External Examination for 50 Marks

(i)	For Continuous Evaluation	–	10 marks
(ii)	For semester end practical Examination	_	40 marks

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P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

Statistical Data Analysis using SPSS and Operations Research-II

Offered to: BA (EMS) & B.Sc (MSCs) / STAPEL61

Course Type: ELECTIVE (Practical)

Year of Introduction: 2017   **Percentage of Revision: Nil**

Semester: VI   Paper No. VII   **Credits: 2**

Hours Taught: 30 periods per Semester   **Max.Time: 2** Hours

Course Prerequisites (if any): Required basic knowledge in computers and mathematical solving

Objective

The objective of this paper is to introduce the students to at least one of the popular Statistical Software Package (SPSS) that are commonly used. The paper shall provide them with an overview of the application and the different computational facilities provided in the package.

	Title of the course: **Statistical Data Analysis using SPSS and Operations Research-II**	
Course Outcome	**Course: STAPEL61** Upon successful completion of this course, students should have the knowledge and skills to:	**P.O Mapping**
CO 1	Apply statistical analysis that can test hypothesis under parametric test.	PO5
CO 2	Apply statistical analysis that can test hypothesis under Non – parametric test	PO5
CO3	Discriminate different test procedure using SPSS techniques.	PO6
CO 4	Solving LPP for transportation method	PO5
CO 5	Solving LPP for Assignment and Replacement methods	PO5

CO-PO MATRIX								
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
STAPEL61	CO1					M		
	CO2					M		
	CO3						M	
	CO4					H		
	CO5					H		

Chapter No	Theme	Key Topics
SPSS TECHNIQUES		
1	**T-Test**	One Sample, Independent Sample, Paired Sample
2	**Analysis of variance**	One-way and Two- way classification, Multiple pairwise comparisons tests
3	**Non Parametric Tests**	Mann Whitney U test, Wilcoxon Signed ranks test, Kruskal Wallis Test, Friedman Test
4	**Chi square Test**	Test of Independence, 2x2 Cross tabulation, Goodness of fit
OPERATIONS RESEARCH TECHNIQUES		
5	**Linear Programming Problem - Advance Techniques**	Revised simplex method and bound ed variable technique
6	**Transportation Problem**	Minimzation ,Maximization and Time minimization transportation problem
7	**Assignment Problem**	Minimzation ,Maximization and Typical Assignment problem
8	**Replacement Problem**	Replacement policy for items whose maintenance cost increases with time and money value changes with constant rate and Replacement of items that fail completely:

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P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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STATCL61 - Hybrid Operations Research Models

Offered to: B.A/B.SC (MSCs A&B)

Course Type: Core (Theory)

Year of Introduction: 2017-18   **Percentage of Revision:**

Semester: VI   Paper No. VIII   **Credits: 3**

Hours Taught: 60 periods per Semester   **Max.Time: 3** Hours

Course Prerequisites: Students required knowledge in Linear Programming Techniques

Course Objectives: The main objective of this course is to acquaint students with basic concepts in hybrid operations research models

Learning Outcomes: At the end of the course, the student will

1) able to understand to various Inventory control models

2) get the knowledge to solve construction of network diagram

Course Outcomes		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	To explain the meaning of deterministic inventory control models	PO5
CO 2	To explain the meaning of probabilistic demand models	PO5
CO3	To develop skills in construction of network diagram	PO6
CO 4	To find the minimum completion time of the project	PO6
CO 5	To apply the techniques of CPM and PERT	PO7

CO-PO MATRIX

COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
STATCL61	CO1					M		
	CO2					H		
	CO3						M	
	CO4						M	
	CO5							L

Syllabus

Unit	Learning Units	Lecture Hours
I	**Inventory Control -I** Basic concepts of inventory problems, Types of inventories and Cost associated with inventories. Factors affecting inventory control. The concept of EOQ (Economic Order Quantity). Deterministic inventory problems (Static Demand Model). The EOQ model without shortage - The economic lot size system with uniform demand, Different rates of demand in different cycles, Finite rate of replenishment (EOQ production Model). Simple problems	12
II	**Inventory Control-II** Price Breaks (Quantity Discounts): Problems of EOQ with One price break and More than one price break. Simple problems. Probabilistic inventory models-Instantaneous demand, No setup cost model - Discrete case and Continuous case. Newspaper Boy Problem. Simple problems	12
III	**Network Scheduling -I** Basic steps in PERT/CPM techniques, Basic components, Logical sequencing (errors in drawing networks) Rules for network construction, Critical path analysis, Forward pass Method Backward pass Method Determination of floats and slack times. Simple problems	12
IV	**Network Scheduling -II** Probability considerations in PERT (Project Evaluation and Review Technique). Distinction between PERT and CPM, Applications of network techniques. Limitations and difficulties in using Network Project Cost, Time cost optimization	12

	Algorithm Simple problems.	
V	**Learning Curve theory** Graphical and Tabular presentation of Learning curve, Learning curve equation, Specific learning curves, Regression and learning curve, Learning curve table when production is not exactly doubled, Uses of learning curve, Costs affected by learning curve, Learning curve theory in manufacturing organisation, Advantages of learning curve theory, Limitations of Learning curve theory	**12**

TEXT BOOK:

1. **KantiSwarup, P.K.Gupta , Man Mohan,Operations Research,**
   15th Edition, 2010, Sultan Chand & Sons, New Delhi.

Unit I: Chapter 19:   Section 19.2, 19.6, 19.7, 19.9, 19.10

Unit II :   Chapter 19:   Section 19.12,

Unit II: **Chapter 26   Model VI(a), VI(b)** Operations Research Theory, Methods and Applications, S.D. Sharma, HimanshuSharma, improved and enlarged edition(16 th revised), 2009 KedarNathRamNath& Co., Meerut.

Unit III: Chapter 25:   Section 25.2-25.4, 25.6.

Unit IV: Chapter 25:   Section25.7,25.8-25.11,

                 Chapter 26:   Section 26.2,26.3,

Unit V: Chapter 32:   Section 32.2-32.11

List of Reference Books:

1. Quality,Reliability& Operations Research, First Edition (2010), Published by Telugu Akademi,Hyderabad.

2. Operations Research Theory, Methods and Applications, S.D. Sharma, Himanshu Sharma, improved and enlarged   edition, KedarNathRamNath& Co., Meerut.

3. Kirshna's Operations Research, Dr. R. K. Gupta, 27 thEdition , 2010, Krishna   Prakashan Media (P) Ltd., Meerut.

4. Operations Research: Theory and Applications, J.K.Sharma, 5th Edition, 2013, Macmillan.

5. Operations Research: An Introduction, Hamdy. A. Taha, 9th edition ,2010, Prentice   Hall.

Structure of Model Paper

Section A: Eight questions are to be set (atleast one from each unit),of these five questions are to be
          answered.   (5 X 5M = 25 M)

Section B: Two questions from each unit with internal choice.   (5 X 10M =50M)

Websites of Interest: http://onlinestatbook.com/rvls/index.html

Co-Curricular Activities in the class:

1. Pictionary

2. Case Studies on topics in field of statistics

3. Snap test and Open Book test

4. Architectural – To be build the procedures

5. Extempore – Random concept to students

6. Interactive Sessions

7. Teaching through real world examples

Model Question Paper Structure for SEE

Max.: 75 Marks **Min.Pass : 30 Marks**

SECTION A

Answer any FIVE questions. Each question carries 5 marks. **5 x 5M=25M**

1. Derive the minimum cost and optimal order quantity with the inventory model having uniform demand and several production runs of unequal length without shortage costs in deterministic situation.(finite rate of replenishment). (Co – 1, L - 4)

2. Write a note on the EOQ problem with one price break. (Co – 1, L - 1)

3. What is inventory? Why inventory is maintained? (Co – 2, L - 1)

4. State the objects of CPM and PERT write the algorithm of it. (Co – 3, L - 1)

5. What are the difference between CPM and PERT? (Co – 3, L - 1)

6. Explain the concept of learning curve. (Co –5 , L - 5)

7. Describe briefly the EOQ concept. What are its limitations? Discuss. (Co – 2, L -)

8. Write the time cost optimization algorithm. (Co – 4, L - 1)

SECTION B

Solve any FIVE problems. Each question carries 10 marks. **5 x10 M = 50M**

9. (a)A contractor has to supply 10,000 bearings per day to an automobile manufacturer. He finds that, when he stars a production run. He can produce 25,000 bearings per day. The cost of holding a bearing in stock for one year is 20 paisa and the set up cost of a production run is Rs 180. How frequently should production run to be made? (Co – 1, L - 3)

OR

9. (b) An oil engine manufacturer purchasers lubricants at the rate of Rs.42 per piece per from a vendor .The requirement of these lubricants is 1,800 per year .what should be the order quantity per order , if the cost per placement of an order is Rs.16 and inventory carrying charge per rupee per year is only 20paise. (Co – 1, L - 3)

10. (a) A project consists of a series of tasks A,B,....H,I with the following relationships   (W<X,

Y means X and Y cannot start until W is completed; X,Y< W means W cannot   startuntil   both X and Y are completed). With this notation construct the network diagram having the following constraints:

A < D, E;	B, D < F;	C < G;	B, G < H;	F, G < I

Find also the minimum time of completion of the project, when the time of completion of each task is as follows :   (Co – 2, L - 3)

TASK	A	B	C	D	E	F	G	H	I
TIME	23	8	20	16	24	18	19	4	10

OR

10.(b)   A small project consists of seven activities, the details of which are given below:

Activity	A	B	C	D	E	F	G
Most likely	3	6	3	10	7	5	4
Optimistic	1	2	3	4	3	2	4
Pesimistic	7	14	3	22	15	14	4
Preceding Activities	-	-	B	C	A, D	D	A, D
Duration	6	5	2	2	2	1	6

(i)   Draw the network, number the nodes, find the critical path, the expected project completion time and the next most critical path.

(ii) What project duration will have 95% confidence of completion? (Co – 2, L - 3)

11.   (a)   Explain Logical sequencing in network diagram and write the rules for constructing the network diagram.   (Co – 3, L - 5)

OR

(b)   Draw the network diagram for the following data: (Co – 3, L - 5)

Activity	A	B	C	D	E	F	G	H	I
Relation	A < B	B < E,F	C < G	D < C,F,A	E,J < I	F < H	G < B	H < B	-

12. (a) Find the optimum order quantity for a product for which the price breaks are as follows:

Quantity	Purchasing cost per unit (Rs)
$0 \le Q_1 < 100$	20
$100 \le Q_2 < 200$	18
$200 \le Q_3$	16

The monthly demand for the product is 400 units. The storage cost is 20% of the product and the cost of ordering is Rs.25.00 per month. (Co – 4, L - 4)

OR

(b) Derive the newspaper boy problem. (Co – 4, L - 4)

13. (a) Given below are the following cumulative average costs. Determine the learning curve and hence the appropriate learning rate: (Co – 5, L - 5)

Number of units(x)	1	2	3	4	5	6	7	8
Cumulative average cost(y)	49	33	29	25	20	18	17	17

OR

(b) Discuss the application of the learning curve. (Co – 5, L - 5)

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An Autonomous College in the jurisdiction of Krishna University,

Machilipatnam, Krishna District, Andhra Pradesh, India

STATISTICS	2017-18	B.A(EMS)/B.Sc.(M.S.CA)
SEMESTER − V	**STAPCL61 Practical -VIII**	No. of credits: 2

Hybrid Operations Research Models

TITLE OF THE COURSE :HYBRID OPERATIONS RESEARCH MODELS COURSE CODE: STAPCL61		
COURSE OUTCOME	**COURSE OUTCOME -III BA /CAMS**	**PROGRAM OUTCOME**
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO_1	Know how to compute the critical path ,the project completion time and Time – cost optimization techniques	PO1
CO_2	Compute the probability of the project being completed by a specific time	PO7
CO_3	Demonstrate the deterministic Inventory Models	PO6
CO_4	Demonstrate the Stochastic Inventory Models	PO7
CO_5	Determine Learning Curve and learning rate	PO6

CO-PO MATRIX								
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
STAPCL61	**CO1**	**H**						
	CO2							**M**
	CO3						**M**	
	CO4							**M**
	CO5						**M**	

I. Project Management:

1) To Construction the PERT network, calculation of expected completion time forthe project using Critical path method

2) To determine the probability that project is completed within specified

time.
3) Time – cost optimization techniques
II. Deterministic Inventory Models
4) The fundamental problem of EOQ
5) Problem of EOQ with Finite replenishment (production)
6) Problems of EOQ with Price

breaks III Stochastic Inventory Models

7) Instantaneous Demand, No set-up cost model- discrete case
8) Instantaneous Demand, No set-up cost model-

continuous case IV Learning Curve theory

9) Specific learning curves
10) Regression and Learning curve

Text Book: 1.

2. Operations Research Theory, Methods and Applications, S.D.

Sharma, HimanshuSharma, improved and enlarged edition(16th revised

), 2009 KedarNathRamNath& Co., Meerut

Structure of Practical Paper-VIII

External Examination for 50 Marks

(i)For Continuous Evaluation – 10 marks
(ii)For semester end practical Examination _ 40 marks

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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STATCL62 - Stochastic Operations Research Models

Offered to: B.A(EMS)/B.SC (MSCs)

Course Type: Core (Theory)

Year of Introduction: 2017-18   **Percentage of Revision:**

Semester: VI   Paper No. IX   **Credits: 3**

Hours Taught: 60 periods per Semester   **Max.Time: 3** Hours

Course Outcomes		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	To know the characteristics of game theory	PO5
CO 2	To find the solution of game problem by using different techniques	PO6
CO3	To explain clearly the distinguishing features of Queuing problem	PO5
CO 4	To Find the average number of customers in the Queue system	PO6
CO 5	To find the average waiting time in the Queue system	PO6

CO-PO MATRIX								
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
STATCL62	CO1					M		
	CO2						M	
	CO3					H		
	CO4						H	

	CO5							H	

Syllabus

Unit	Learning Units	Lecture Hours
I	**Theory of Games -I** Basic definitions of game theory, Competitive game - Zero-sum and Non-zero sum games, Strategy - pure strategy, Mixed strategy, Two- person, zero- sum games, Pay-off matrix. characteristics of game theory, Rectangular games, Minimax - Maximin principle - Saddle point, Optimal strategies and Value of game. Solution of games with saddle points, Games without saddle points - mixed strategies. Minimax - Maximin principle for mixed strategy games. Graphical method for (2 X n) and (m X 2) games. Dominance property and simple problems.	12
II	Theory of Games –II Two- By – Two games without saddle point, Linear programming method (2X3, 3X2, 3X3 games only) Algebraic method for the solution of a general game (3 x3 games only). Fundamental theorem of game theory (Minimax theorem- statement only). Summary of methods for Rectangular games. Limitations of game theory. Simple problems	12
III	**Queuing Theory-I** Queuing system, Elements of a queuing system, Operating characteristics of a queuing system, Transient and steady states. Traffic intensity or utilization factor. Probability distributions in queuing systems - Distribution of arrivals the Poisson process (Pure birth Process), Inter-arrival times (Exponential Process), Markovian property of inter arrival times, Departures (Pure Death Process) and service time, Derivation of service time distribution.	12
IV	**Queuing Theory-II** Classification of queuing models- Probabilistic Queuing Models, Solution of Queuing models, Limitation for application of Queuing models, Poisson queuing systems-**Model I**:(M/M/1):(∞/ FIFO)- Birth and Death Model. Characteristics of (M/M/1): (∞/ FIFO) - $E(L_q), E(L_s),\ E(L/L>0), V(Queue\ Length)$. PDF of Waiting time distribution for (M/M/1): (∞/ FIFO), Characteristic of waiting time distribution(M/M/1): (∞/ FIFO) - $E(W_q), E(W_s)$, $E(W/W>0)$, Inter-Relationship between $E(L_q), E(L_s) E(W_q), E(W_s)$. Simple problems	12
V	**Queuing Theory-III** Poisson queuing systems-**Model II**:(M/M/1):(∞ /SIRO), Probability distribution of queue length :(M/M/1):(∞/SIRO), Characteristics of (M/M/1): (∞/ SIRO), $E(L_q), E(L_s),\ E(L/L>0), V(Queue\ Length)$. PDF of Waiting time	12

	distribution for (M/M/1): (∞ / SIRO), Characteristic of waiting time distribution(M/M/1): (∞ / SIRO) - $E(W_q), E(W_s)$, $E(W/W > 0)$. Poisson queuing systems-**Model III**:(M/M/1):(N/FIFO), Probability distribution of queue length of (M/M/1):(N/FIFO), Characteristics of (M/M/1): (N/ FIFO) - $E(L_q), E(L_s)$, Characteristic of waiting time distribution(M/M/1): (N/ FIFO) - $E(W_q), E(W_s)$. Simple problems based on (M/M/1): (N/ FIFO).	

TEXT BOOK:

1**.** Operations Research Theory, Methods and Applications, S.D. Sharma, HimanshuSharma, improved and enlarged edition(16 th revised), 2009 KedarNathRamNath& Co., Meerut.

2**.** KantiSwarup, P.K.Gupta , Man Mohan,Operations Research,

15th Edition, 2010, Sultan Chand & Sons, New Delhi.

Unit I:	Text book 1 :	Chapter 24
Unit II :	Text book 1 :	Chapter 24
Unit III:	Text book 1 :	Chapter 28,
	Text book 2:	Chapter 21: sections 21.2-21.8(page no 591-596)
Unit IV:	Text book 1 :	Chapter 28,
	Text book 2:	Chapter 21: sections 21.9 (page no 597-607)
Unit V:	Text book 1 :	Chapter 28,
	Text book 2:	Chapter 21: sections 21.9 (page no 608-611)

List of Reference Books:

1. Quality,Reliability& Operations Research, First Edition (2010), Published by Telugu Akademi,Hyderabad.

2. Kirshna's Operations Research, Dr. R. K. Gupta, 27 thEdition , 2010, Krishna   Prakashan Media (P) Ltd., Meerut.

3. Operations Research: Theory and Applications, J.K.Sharma, 5th Edition, 2013, Macmillan.

4. Operations Research: An Introduction, Hamdy. A. Taha, 9th edition ,2010, Prentice   Hall.

5. Operations research Algorithms and applications, RathindraP.Sen, 2010 PHI Learning private limited, New Delhi,

Structure of Model Paper

Section A: Eight questions are to be set (atleast one from each unit),of these five questions are to be answered.   (5 X 5M = 25 M)

Section B: Two questions from each unit with internal choice.   (5 X 10M = 50M)

Websites of Interest: http://onlinestatbook.com/rvls/index.html

Co-Curricular Activities in the class:

1. Pictionary

2. Case Studies on topics in field of statistics

3. Snap test and Open Book test

4. Architectural – To be build the procedures

5. Extempore – Random concept to students

6. Interactive Sessions

7. Teaching through real world examples

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Model Question Paper Structure for SEE

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Max.: 75 Marks   **STATCL62**   **Min.Pass : 30 Marks**

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SECTION A

</div>

Answer any FIVE questions. Each question carries 5 marks.   **5 x 5M=25M**

1. Define saddle point and the value of game with examples. (Co -1 , L -1)

2. What is queueing problem? Give some important applications of queueing theory. (Co -3 ,L-1)

3. Define (i) Competitive Game, (ii) Payoff Matrix, (iii) Pure and Mixed Strategies, (Co-3 , L - 1)

4. Write about pay-off matrix and Maximin and Minimax criteria. (Co -2 , L -2)

5. What are the major limitations and applications of the game theory? (Co -2 , L -1)

6. Write the basic characteristics of queue system. (Co - 3, L -2)

7. What are Transient and Steady states cases in queueing theory. (Co - 4, L -1)
8. Obtain $E\left(L_q\right)$ and $E\left(W_s\right)$ for (M/M/1): (N/FIFO) (Co - 5, L -1)

SECTION B

Answer the following Questions. Each question carries 10 marks.   **5 x10 M = 50M**

9.   (a) Solve the following game using dominance property (Co - 1, L - 3)

$player\ B$

		I	II	III	IV
	I	3	2	4	0
Player A	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

OR

(b) Solve the game whose payoff matrix is given by (Co - 1, L - 3)

$$\begin{bmatrix} -2 & 0 & 0 & 5 & 3 \\ 3 & 2 & 1 & 2 & 2 \\ -4 & -3 & 0 & -2 & 6 \\ 5 & 3 & -4 & 2 & -6 \end{bmatrix}$$

10. (a) Solve the following game (Co - 2, L - 3)

$Player\ \mathbf{B}$

$$Player\ A \begin{bmatrix} -4 & 3 \\ -7 & 1 \\ -2 & -4 \\ -5 & -2 \\ -1 & -6 \end{bmatrix}$$

OR

(b) Solve the following game by linear programming technique (Co - 2, L - 3)

$$\begin{array}{c} \textit{Player B} \\ \textit{Player A} \begin{bmatrix} 1 & -1 & 3 \\ 3 & 5 & -3 \\ 6 & 2 & -2 \end{bmatrix} \end{array}$$

11. (a) Show that distribution of arrivals follows the Poisson distribution (Co - 5, L - 1)

OR

(b) State and prove Markovian property of inter arrival times. (Co - 5, L - 1)

12. (a) **A**rrivals at a telephone booth are considered to be Poisson, with an average time of 10 minutes between one arrival and the next. The length of a phone call assumed to be distributed exponentially with mean 3 minutes. Then,

a) What is the probability that a person arriving at the booth will have to wait ?

b) What is the average length of the queues that form from time to time ?

c) The telephone department will install a second booth when convinced that an arrival would expect to have to wait at least three minutes for the phone. By how much must the flow of arrivals be increased in order to justify a second booth ? (Co - 3, L - 4)

OR

12 (b) Derive the steady state equations of (M/M/1):(∞ /FIFO)Model and solve it. (Co - 3, L - 4)

13. (a) Prove that (i) $E(L_q)$ (ii) $E(L_s)$, for model (M/M/1): (∞ / SIRO) (Co - 4, L - 5)

OR

(b) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Assuming that the inter - arrival time follows an exponential   distribution and the service time (the time taken to hump a train) distribution is also exponential with an average 36 minutes. If the yard can admit 9 trains at a time (there being 10 lines, one of which is   reserved   for shunting purposes), calculate the probability that the yard is empty and find the average queue length. (Co - 4, L - 5)

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P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

OPERATIONS RESEARCH

Offered to: BA(EMS) & B.Sc (MSCs) / STATEL61

Course Type: ELECTIVE (Theory)

Year of Introduction: 2017   **Percentage of Revision: Nil**

Semester: VI   Paper No. VII   **Credits: 3**

No. Hours Taught: 60 periods per Semester   **Max.Time:** 3 Hours

Course Prerequisites (if any): Students required Mathematical modeling

Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	To Understand the knowledge on Advanced Techniques in simplex method	PO5
CO 2	To Compute the optimal solutions of the transportation problem used in real life situations	PO5
CO3	To analyze the job to assigned to the works	PO6
CO 4	To elevate the importance of Sequencing problem	PO6
CO 5	To design a mathematical model for an optimization problem in real life by adopting the techniques of operations research.	PO7

COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO-PO MATRIX							
STATEL61	CO1					M		
	CO2						H	
	CO3						H	

	CO4							M	
	CO5								L

Syllabus

Unit	Learning Units	Lecture Hours
I	**Linear programming problem - Advanced Techniques** Revised Simplex Method- Algorithm, simple problems (2 and 3 variables), Simplex method versus revised simplex method, Bounded Variables-computational procedure and Simple problems(2 and 3 variables)	12
II	**Transportation Problem** L. P. formulation of the Transportation Problem, Tabular Representation, Initial Basic Feasible Solution(I.B.F.S.) to Transportation Problem- North West Corner, Least Cost and Vogles approximation Methods. The Optimality Test - Transportation Algorithm - MODI(Modified Distribution Method), Degeneracy in Transportation Problem, Some Exceptional Cases-Unbalanced, Prohibited, Maximization Transportation Problems. Time minimization transportation problem. Simple problems.	12
III	**Assignment Problem** Mathematical formulation of the problem, Hungarian method for Assignment problem. Special cases in Assignment problems-Unbalanced, Prohibited, Maximization, Travelling salesman problem, A typical Assignment Problem. Simple problems.	12
IV	**Sequencing Problem** Problem of Sequencing, Principal Assumptions, Solution of Sequencing Problem-Processing n jobs through 2-Machines and Processing n jobs through 3-Machines- Johnson's Optimal sequence Algorithm. Processing n jobs through k-Machines- Johnson's Optimal sequence Algorithm. Simple problems	12
V	**Replacement Problem** Introduction, Replacement of items that deteriorate gradually replacement policy for items whose maintenance cost increases with time and money value is constant When time is continuous variable, when time is discrete variable, Simple problems. Replacement policy for items whose maintenance cost	12

	increases with time and money value changes with constant rate. Simple problems. Replacement of items that fail completely: Individual Replacement policy, Group replacement of items that fail completely. Simple problems	

Text Book: **KantiSwarup, P.K.Gupta , Man Mohan,Operations Research,**

15th Edition, 2010, Sultan Chand & Sons, New Delhi.

Unit I: Chapter 9:   Section 9.2 ,9.3,9.4,

Unit II :   Chapter 10:   Section 10.1, 10.2, 10.4-10.6, 10.8 - 10.13, 10.15, 10.16,

Unit III: Chapter 11:   Section 11.1-11.5,11.7.

Unit IV: Chapter 12   Section 12.1 - 12.5,

Unit V: Chapter 18   Section 18.1 - 18.3.

List of Reference Books:

1.   Quality, Reliability& Operations Research, First Edition (2010), Published by Telugu Akademi,Hyderabad.

2.   Operations Research Theory, Methods and Applications, S.D. Sharma, Himanshu Sharma, improved and enlarged   edition, KedarNathRamNath& Co., Meerut.

3.   Krishna's Operations Research, Dr. R. K. Gupta, 27 th Edition , 2010, Krishna   Prakashan Media (P) Ltd., Meerut.

4.   Operations Research: Theory and Applications, J.K.Sharma, 5th Edition, 2013, Macmillan.

5.   Operations Research: An Introduction, Hamdy. A. Taha, 9th edition ,2010, Prentice   Hall.

Websites of Interest: **http://onlinestatbook.com/rvls/index.html**
Co-Curricular Activities in the class:
1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions

                        Model Question Paper Structure for SEE
Max.: 75 Marks   **Min. Pass: 30 Marks**
                  Operations Research   **STATEL61**

Model Paper

SECTION A

Answer any FIVE questions. Each question carries 5 marks.   **5 x 5M = 25M**

1. State the computational procedure for resolving a LPP with upper bound condition. (Co-1, L - 1)

2. Write a short note on Time-Minimization in transportation problem. (Co – 2, L -1)

3. Write a short note on travelling salesman problem. (Co – 3, L - 1)

4. What is a sequencing problem? Describe the method of processing 'n' jobs through two

   Machines. (Co – 4, L - 1)

5. What is meant by an 'Assignment Problem'? Describe a method of drawing minimum number of

   lines in the context of assignment problem. (Co – 3, L -1)

6. The cost of maintenance of a machine is given as a function increasing with time and its scarp

   value is constant. Show that the average annual cost will be minimized by replacing the machine

   when the average cost to date becomes equal to the current maintenance cost. (Co – 4, L - 1)

7. Explain Vogel's approximation method for solving Transportation Problem. (Co – 2, L -2)

8. Describe various types of replacement situations. (Co – 5, L -2)

SECTION B

Answer the following Questions. Each question carries 10 marks.   **5 x 10M = 50M**

9. (a) Use revised simplex method to solve the following L.P.P.   (Co – 1, L -4)

   Maximize $Z = 6X_1 – 2X_2 + 3X_3$

   Subject to the constraints: $2X_1 – X_2 + 2X_3 \leq 2$

   $$X_1 + 4X_3 \leq 4$$

   $$\text{and } (X_1, X_2, X_3) \geq 0$$

   (OR)

   (b) Solve the following LPP by the bounded algorithm.   (Co – 1, L - 4)

   Maximize $Z = 3X_1 + 5X_2 + 3X_3$

   Subject to the constraints: $X_1 + 2X_2 + 2X_3 \leq 14$

   $$2X_1 + 4X_2 + 3X_3 \leq 23$$

   $$0 \leq X_1 \leq 4, \ 0 \leq X_2 \leq 5, \ 0 \leq X_1 \leq 3$$

10. (a) Solve the following transportation problem to find the minimum transportation

cost: (Co – 2, L -4)

Source	Destination					Available
	D_1	D2	D3	D4	D5	
S_1	4	7	3	8	2	4
S_2	1	4	7	3	8	7
S_3	7	2	4	7	7	9
S_4	4	7	2	4	7	2
Required	8	3	7	2	2	

(OR)

10. (b) A company has four factories situated in four different locations in the country and four

sales agencies located in four other locations in the country. The cost of production (Rs.

per unit), the sales price, capacities and monthly requirement are given below:

Factory	Sales agency				Monthly capacity (units)	Cost of production
A	7	5	6	4	10	10
B	3	5	4	2	15	15
C	4	6	4	5	20	16
D	8	7	6	5	15	15
Monthly requirement (units)	8	12	18	22		
Sales price	20	22	25	18		

Find the monthly production and distribution schedule which will maximize profit.

11. (a) A manufacturing company has four zones A, B, C, D and four sales engineers P, Q, R, S respectively for assignment. Since the zones are not equally rich in sales potential, it is estimated that a particular engineer operating in a particular zone will bring the following sales:

Zone A: 4,20,000,Zone B: 3,36,000,Zone C: 2,94,000,Zone D:4,62,000

The engineers are having different sales ability. Working under the same conditions their yearly sales are proportional to 14, 9, 11 and 8 respectively. The criteria of maximum expected total sales is to be met by assigning the best engineer to the richest zone, the next bets to the second richest zone and so on. Find the optimum assignment and the maximum sales. (Co – 3, L -4)

(OR)

11. (b) Consider the problem of assigning five operators to five machines. The assignment costs are given below:

Operators		Machines			
	A	B	C	D	E
I	10	3	10	7	7
II	5	9	7	11	9
III	13	18	2	9	10
IV	15	3	2	7	4
V	16	6	2	12	12

Assign the operators to different machines so that total cost is minimised.

(Co – 3, L - 4)

12. (a) Determine the optimal sequence of jobs that minimizes the total elapsed time based on the following information processing time on machines is given in hours and passing is not allowed: (Co – 4, L - 4)

Job :	A	B	C	D	E	F	G
Machine M$_1$:	3	8	7	4	9	8	7
Machine M$_2$:	4	3	2	5	1	4	3
Machine M$_3$:	6	7	5	11	5	6	12

(OR)

12. (b) In a factory, there are six jobs to perform, each of which should go through two machines

A and B, in the order A, B. The processing timings (in hours) for the jobs are given

here. You are required to determine the sequence for performing the jobs that

would minimize the total elapsed time, T. What is the value of T?

Job:	J$_1$	J2	J3	J4	J5	J6
Machine A:	1	3	8	5	6	3
Machine B:	5	6	3	2	2	10

(Co – 4, L -4)

13. (a) A manufacturer is offered two machines A and B. A is priced at Rs.5,000, and running costs are estimated at Rs.800 for each of the first five years, increasing by Rs.200 per year in the sixth and subsequent years. Machine B, which has the same capacity as A, costs Rs.2,500 but will have running costs of Rs.1,200 per year for six years, increasing by Rs.200 per year thereafter. If money is worth 10% per year, which machine should be purchased? (Assume that the machine will eventually e sold for scrap at a negligible price.)   (Co – 5, L - 4)

(OR)

13. (b) The following failure rates have been observed for a certain type of light bulbs:

week	:	1	2	3	4	5
% failing by end of week	:	10	25	50	80	100

There are 1,000 bulbs in use, and it costs Rs 2 to replace an individual bulb which has burnt out. If all bulbs were replaced simultaneously, it would cost 50 paisa per bulb. It is

proposed to replace all bulbs at fixed intervals, whether or not they have burnt out, and to continue replacing burnt out bulbs as they fail. At what interval should all the bulbs be replaced?   (Co – 5, L - 4)

PARVATANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10
(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam, A.P., India)

COMPUTER SCIENCE	CSCT51	2017 – '18	B.Sc. (MPCS, MECS, MSCA,MSCS,CAME))

SEMESTER – V   **PAPER – V**   **Credits: 3**
TOTAL HRS: 60

SOFTWARE ENGINEERING

Course Objectives:

1. The Objective of the course is to assist the student in understanding the basic theory of software engineering.
2. To apply these basic theoretical principles to a group software development project.

Course Outcomes:

Course Outcome No	Upon successful completion of this course, students should have the knowledge and skills to:	Program Outcome No
CO1	Ability to gather and specify requirements of the software projects.	PO1,PSO1,PSO2,PSO4
CO2	Ability to use perfect models according to the requirements of the software projects.	PO1, PSO1,PSO2,PSO4
CO3	Ability to analyze software requirements with existing tools.	PO1, PSO1,PSO2,PSO4
CO4	Able to use different class diagrams, user interface designs, chart diagrams.	PO1,PO7, PSO1,PSO2,PSO4
CO5	Able to differentiate different testing methodologies.	PO1,PO7, PSO1,PSO2,PSO4

UNIT–I: **15 Hrs**
Introduction: The Software Engineering – Evolution and impact, Software Development Projects,Software Process and Project Metrics,Emergence of Software Engineering, Computer Systems Engineering,

Software Life cycle models: Need for life Cycle model, classical waterfall model, Iterative waterfall model,V-model, Prototyping model, Evolutionary model, Spiral model, Comparison of different life cycle models.

UNIT–II: **10 Hrs**

Software Project Management: Responsibilities of a Software Project Manager, Project planning, Metrics for Project size estimation and scheduling.

Requirement Analysis: Requirements gathering and analysis, Software Requirements Specification ___ contents of the SRS document, Functional requirements, Traceability, Characteristics of good SRS DOCUMENT, Organization of the SRS document.

UNIT-III: **13 Hrs**
Software Design: Desirable characteristics of a good software design, Cohesion and coupling, Layer Arrangement of Modules, Function-oriented design and Object-oriented design.
Function-oriented software Design: Overview of SA/SD methodology, structured analysis,   Data Flow Diagrams, Structured Design and Detailed Design.

UNIT-IV: **12 Hrs**
Unified Modeling Language: Overview of Object-oriented concepts, Unified Modeling Language, UML diagrams, use case model class diagrams, Interaction diagrams, Activity diagrams, state chart diagrams

User Interface Design: Characteristics of good user interface design, Basic concepts, Types of user interfaces, component-based GUI development, A user interface Design Methodology

UNIT-V: **10 Hrs**
Coding and Testing: Coding standards & guidelines, code review, testing, unit testing, Black-box testing, White-box testing, Debugging, Integration testing, System testing.
Software Reliability and Quality Management: Software Reliability, Statistical Testing, Software Quality.

Text Book: Fundamentals of Software Engineering   -By RAJIBMALL –PHI Third Edition

REFERENCE BOOKS:

 1. Roger Pressman S., "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw Hill, 2010.

2. Sommerville, "Software Engineering", Eighth Edition, Pearson Education, 2007.

COMPUTER SCIENCE	CSCT52	2017 – '18	B.SC(MPCS, MECS, MSCA,MSCS,CAME)

SEMESTER – V   **PAPER – VI**   **Credits – 3**

DBMS   Total Hrs: 60

Course Objective:

1. To educate student regarding databases and how to manage databases.
2. To provide knowledge about creating relationships.
3. To provide knowledge about dependencies and relational constraints.
4. To enable student to write various types of queries for handling data.

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO_1	Have knowledge about database.	PO1,PSO1,PSO2,PSO4
CO_2	Be able to Design a database using ER models	PO1 PSO1,PSO2,PSO4
CO_3	Store, retrieve data in database using Integrity Constraints.	PO1 PSO1,PSO2,PSO4
CO_4	Be able to implement basic relational operations.	PO1,PO7 PSO1,PSO2,PSO4
CO_5	Be able to implement various SQL queries	PO1,PO7 PSO1,PSO2,PSO4

UNIT-I

Overview of Database Management Systems: **12 Hrs**

   1.1 Introduction
   1.2 Data and Information
   1.3 Characteristics of the Database Approach
      1.3.1   Self-Describing Nature of the a Database System
      1.3.2   Insulation between Programs and Data, Data Abstraction
      1.3.3   Support of Multiple Views of the data
      1.3.4   Sharing of Data and \multiuser Transaction Processing
   1.4 Actors on the Scene
      1.4.1   Database Administrators
      1.4.2   Database Designers
      1.4.3   End Users

UNIT-II   **12 Hrs**

UNIT-III   **12 Hrs**

The relational data model, Relational Constraints

3.1 Introduction

3.2 Relational Model Concepts

    3.2.1 Domains, Attributes, Tuples and Relations

        3.2.2 Characteristics of Relations

        3.2.3 Relational Model Notation

3.3 Relational Constraints and Relational Database Schemas

        3.3.1 Domain Constraints

        3.3.2 Key Constraints and Constraints on Null

        3.3.3 Relational Databases and Relational Database Schemas

        3.3.4 Entity Integrity, Referential Integrity and Foreign Keys

Functional Dependencies and normalization for Relational Databases

3.4 Functional Dependencies

        3.4.1 Definition of Functional Dependency

        3.4.2 Inference Rules for Functional Dependencies

        3.4.3 Equivalence of sets of Functional Dependencies

        3.4.4 Minimal Sets of Functional Dependencies

3.5 Normal forms based on primary keys

        3.5.1 Introduction to Normalization

        3.5.2 First Normal Form

        3.5.3 Second Normal Form

        3.5.4 Third Normal Form

3.6 General Definitions of Second and Third Normal Forms

        3.6.1 General Definition of Second Normal Form

        3.6.2 General Definition of Third Normal Form

        3.6.3 Interpreting the General Definition of 3NF

3.7 Boyce-Codd Normal Form

UNIT-IV   **12 Hrs**

The Relational Algebra

4.1 Basic Relational Algebra Operations

    4.1.1 The SELECT Operation
    4.1.2 The PROJECT operation
    4.1.3 Sequences of Operations and the RENAME Operation
    4.1.4 Set Theoretic Operations
    4.1.5 The JOIN Operation
    4.1.6 A Complete Set of Relational Algebra Operations
    4.1.7 The DIVISION Operation

4.2 Additional Relational Operations

    4.2.1 Aggregate Functions and Grouping
    4.2.2 Recursive Closure Operations
    4.2.3 OUTER JOIN and OUTER UNION Operations

4.3 Tuple Relational Calculus

        4.3.1 Tuple Variables and Range Relations

        4.3.2 Expressions and Formulas in Tuple Relational Calculus

        4.3.3 The Existential and Universal Quantifiers

        4.3.4 Example Queries using the Existential Quantifier

UNIT-V   **12 Hrs**

SQL (STRUCTURED QUERY LANGUAGE)

5.1 Introduction

5.2 Data Definition, Constraints and Schema changes in SQL

      5.2.1   Schema AND Catalog Concepts in SQL
      5.2.2   The CREATE TABLE Command and SQL Data Types and Constraints
      5.2.3   The DROP SCHEMA and DROP TABLE Command
      5.2.4   The ALTER TABLE Command

5.3 Basic Queries in SQL

      5.3.1   The SELECT-FROM-WHERE Structure of SQL Queries
      5.3.2   Dealing with Ambiguous Attribute Names and Naming (Aliasing)
      5.3.3   Unspecified WHERE-Clause and Use of Asterisk (*)
      5.3.4   Tables as sets in SQL
      5.3.5   Substring Comparisons, Arithmetic Operators, and Ordering

5.4 More Complex SQL Queries

      5.4.1   Nested Queries and Set Comparisons
      5.4.2   The EXISTS and UNIQUE Functions in SQL
      5.4.3   Explicit Sets and NULLS in SQL
      5.4.4   Renaming Attributes and Joined Tables
      5.4.5   Aggregate Functions and Grouping

5.5 Insert, Delete, and Update Statements in SQL

      5.5.1 The INSERT Command
      5.5.2 The DELETE Command
      5.5.3 The Update Command

5.6 Views (Virtual Tables) in SQL

      5.6.1 Concept of a View in SQL
      5.6.2 Specification of views in SQL
      5.6.3 View Implementation and View Update

5.7 Additional Features of SQL

Prescribed Books:

1. "Fundamentals of Database Systems" by R.Elmasri and S.Navathe
2. "Database System Concepts" by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010.

Reference Books:

1. "Database Management Systems" by Raghu Ramakrishnan, NcGrawhill,2002
2. "Prinicples of Database Systems" by J.D.Ullman
3. "An Introduction to Database Systems" by Bipin C Desai
4. "Fundamentals of Relational Database Management Systems" by S.Sumathi, S. Esakkirajan, Springer Publications

Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
V	MATT51	CORE	Ring theory & Vector calculus	100	25	75	5	5

Course Outcomes of MATT51

S. No	C.O
	Upon successful completion of this course, students should have the knowledge and skills to:
1.	Understand the fundamental concepts of rings and its properties, fields, integral domains and subrings.
2.	Appreciate the significance of maximal &prime ideals
3.	Determine and apply, the important quantities associated with scalar fields, such as partial derivatives of all orders, the gradient vector and directional derivative.
4.	Evaluate line, surface and volume integrals
5.	To verify the seminal integral theorems (Green's theorem in the plane, Gauss' divergence theorem and Stokes' theorem)

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2					H		
CO3						M	
CO4							M
CO5							M
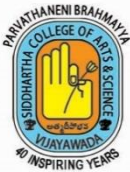
MATHEMATICS	MAT T51	2017 – 18 Onwards	B.A (EMS),B.Sc.(MPC,MPCS,MECS,CAME,MSCS,CAMS)

RING THEORY & VECTOR CALCULUS
SEMESTER-V   **PAPER - V**   **No of Credits: 5**

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATIONAL SKILLS AND MEMORY POWER OF STUDENTS.

UNIT – 1: RINGS& SUB RINGS: (12 hrs)

1.1 Definition of Ring and basic properties, Boolean Rings
1.2 Divisors of zero and cancellation laws in a Ring, Integral Domains, Division Ring and Fields
1.3 The characteristic of a ring – Definition – Theorems.
1.4 Sub Rings – theorems- related problems.

UNIT – 2: IDEALS & HOMOMORPHISMS.   (18 hrs)

2.1 Ideals and Principal ideals – theorems and related problems.
2.2 Maximal Ideals & Prime Ideals.
2.3 Definition of Homomorphism, types of Homomorphism, Elementary Properties of Homomorphism.
2.4 Homomorphic image – theorems- related problems.
2.5 Problems on Homomorphisms and Isomorphisms.
2.6 Kernel of a Homomorphism – Fundamental theorem of Homomorphism.

UNIT –3: VECTOR DIFFERENTIATION   (15 hrs)

3.1 Vector point function – definition – ordinary derivatives of vectors and properties.
3.2 Vector differential operator ∇, gradient of a scalar point function – properties – problems on grad f.
3.3 Divergence & Curl operators – Solenoid & Irrotational vectors – related problems.
3.4 Vector identities – related problems.

UNIT – 4: VECTOR INTEGRATION   (15 hrs)

4.1 Definition of Line Integral – related problems.
4.2 Definition of Surface Integral – related problems.
4.3 Definition of Volume integral – related problems.

UNIT – 5: APPLICATIONS OF VECTOR INTEGRATION   **(15 hrs)**

5.1 Green's theorem in a plane – related problems
5.2 Gauss Divergence theorem – related problems.
5.3 Problems on Stoke's theorem only.

Prescribed Text books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	V. Venkateswara Rao, N. Krishna Murthy.	A text book of mathematics for B.A / B.Sc Volume – II (Unit – II). Pg: 187 - 290	S-Chand& Co	2014
2.	V. Venkateswara Rao, N. Krishna Murthy	A text book of mathematics for B.A / B.Sc Volume – III (Unit – III & IV). Pg: 227 - 385	S-Chand& Co	2012

Reference books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Dr. A. Anjaneyulu	A text book of mathematics for B.A/B.ScVol – III	Deepthi Publications	3rd Edition 2006 – 2007
2	Dr. A. Anjaneyulu	A text book of mathematics for B.A/B.ScVol – I	Deepthi Publications	4th Edition 2004 – 2005
3	A.R. Vashistha& A.K Vashistha	Modern Algebra	Krishna Prakashan Media Ltd.	2007

SEMESTER – V	**Model Paper**	PAPER – V

COURSE CODE   :   MATT51   **Time: 3hrs.**

TITLE OF THE PAPER: RING THEORY & VECTOR CALCULUS   **Max. Marks: 75**

SECTION – A

Answer any FIVE of the following   **5 x 5 = 25 M**

1. If R is a Boolean ring, then prove that R is commutative.   (CO1,L1)

2. If S is an Ideal of a commutative ring with unity and $1 \in S$, then S=R.   (CO1,L1)

3. Prove that every homomorphic image of a commutative ring is commutative. (CO2,L2)

4. If $f : R \rightarrow R^1$ is a homomorphism, then prove that Ker f is an Ideal of R.   (CO2,L2)

5. Find grad f at the point (1, 1, -2) where $f = x^2 y + y^2 x + z^2$ (CO3,L1)

6. Prove that $div\, \bar{r} = 3$ and $curl\, \bar{r} = \bar{0}$.   (CO3,L1)

7. Find $\int_c \bar{F}.d\bar{r}$, where $\bar{F} = 3xy\bar{i} - y^2 \bar{j}$, C is the curve $y = 2x^2$ in XY plane from (0, 0) to (1, 2).
                                                           (CO4, L2)

8. Evaluate by stoke's theorem, $\int_c \bar{F}.d\bar{r}$ where $\bar{F} = yz\bar{i} + zx\bar{j} + xy\bar{k}$ and C is the curve $x^2 + y^2 = 1, z = y^2$.   (CO5,L3)

SECTION – B

Answer the following questions.   **5 x 10 = 50 M**

9. a) Prove that characteristic of an integral domain is either zero or prime.   (CO1, L1)

(OR)

b) If R is a Ring and S_1, S_2 are two subrings of R, then prove that $S_1 U S_2$ is a subring of R iff either $S_1 \subseteq S_2$ or $S_2 \subseteq S_1$ (CO1, L1)

10. a) An ideal S of a commutative ring R with unity is a maximal ideal $\Leftrightarrow \dfrac{R}{S}$ is a field.

(CO2, L2)

(OR)

b) State and Prove Fundamental theorem of Homomorphism. (CO2, L2)

11. a) Find the directional derivative of $\varnothing = x^2 - 2y^2 + 4z^2$ at (1, 1, -1) in the direction of $2i + j - k$. (CO3, L1)

(OR)

b) If $\bar{A}, \bar{B}$ are differential vector point functions, then show that (CO3, L1)
$i) div(\bar{A}X\bar{B}) = \bar{B}.curl\bar{A} - \bar{A}.curl\bar{B}$
$ii) curl(\bar{A}X\bar{B}) = \bar{A}(div\bar{B}) - \bar{B}(div\bar{A}) + (\bar{B}.\nabla)\bar{A} - (\bar{A}.\nabla)\bar{B}.$

12. a) Evaluate $\int_s \bar{F}.Nds$, where $\bar{F} = zi + xj - 3y^2zk$ and S is the surface $x^2 + y^2 = 16$ included in the first octant between Z=0 and Z=5. (CO4, L2)

(OR)

b) If $\bar{F} = (2x^2 - 3z)i - 2xyj - 4xk$, then evaluate i) $\int_v div\,\bar{F}\,dv$ ii) $\int_v curl\,\bar{F}\,dv$, where V is the closed region bounded by x=0, y=0, z=0, 2x+2y+z = 4. (CO4, L2)

13. a) State and Prove Gauss Divergence theorem. (CO5, L3)

(OR)

b) Verify Stoke's theorem for the function $\bar{F} = x^2i + xyj$ integrated round the square in the plane Z=0, whose sides are along the line x=0, y=0, x=a, y=a. (CO5, L3)

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DEPARTMENT OF MATHEMATICS

COURSE STRUCTURE

Semester	Course code	paper	Title of the paper	Total marks	Internal exam	Sem end exam	Teaching hours	credits
V	MATT52	Core	Linear Algebra	100	25	75	5	5

Course Outcomes of MATT52

S.No	C.O	
	Upon successful completion of their course ,students should have the knowledge and skills to	
1.	Knowledge in fundamental concepts of vector spaces	
2.	Ability to understand the basic concepts of Basis and Dimensions	
3.	Discuss the linear transformations, rank and nullity	
4.	Appreciation in the concept of matrices as a tool in solving system of linear equations and determining eigen values and eigen vectors	
5	Ability to understand the basis concepts of inner product spaces and to develop hypothetical ideas and laws to solve the related problems in the context	

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1							M
CO2							M
CO3						M	
CO4					H		
CO5					H		
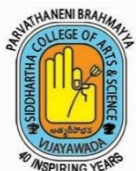
MATHEMATICS	MAT T52	2017 – 18 Onwards	B.A (EMS), B.Sc.(MPC,MPCS,MECS,CAME,MSCA,MSCS)

LINEAR ALGEBRA

SEMESTER-V   **PAPER - VI**   **No of Credits: 5**

OBJECTIVE: TO ENHANCE THE ANALYTICAL SKILLS AND APPLICATION SKILLS.

UNIT I: Vector spaces   (15hrs)

1.1 Vector space definition – general properties of Vector space.

1.2 subspace definition – theorems & related problems.

1.3 Linear sum of two subspaces, linear combination of vectors and linear span of a set –

    theorems &related problems.

1.4 Linear dependence of vectors - theorems & related problems.

1.5 Linear independence of vectors - theorems & related problems.

UNIT II: Basis and Dimension   (12hrs)

2.1 Basis of a vector space – definition, Basis existence, Basis extension, Basis Invariance,

    theorems.

2.2 Coordinates – definition & related problems.

2.3 Dimension of a vector space, dimension of a subspace - theorems & related problems.

2.4 Quotient space, dimension of Quotient space - theorems.

UNIT III: Linear Transformation   (12hrs)

3.1 Vector space homomorphism – definitions

3.2 Linear transformation, Properties of L.T., Determination of L.T. - theorems & related

    problems.

3.3 Sum of linear transformations, scalar multiplication of L.T., product of linear

    transformations, Algebra of linear operators - theorems & related problems.

3.4 Range & Null space of a L.T. – Definitions, theorems & related problems.

3.5 Rank nullity theorem - related problems.

UNIT IV: Matrices   (24hrs)

4.1 Fundamentals of Matrices.

4.2 Elementary matrix operations & elementary matrices.

4.3 Rank of a matrix – definition, related problems.

4.4 Echelon form of a matrix, reduction to normal form, PAQ form, Inverse of a matrix –
    related problems only.

4.5 System of linear equations – homogeneous & non homogeneous linear equations - related
    problems.

4.6 Eigen values & Eigen vectors of a matrix – definitions, theorems & related problems.

4.7 Cayley - Hamilton theorem, related problems.

UNIT V: Inner product spaces   (12hrs)

5.1 Inner product spaces – definition, Norm (or) Length of a vector - theorems & related
    problems.

5.2 Schwarz in equality, Triangle inequality, parallelogram law – theorems.

5.3 Orthogonality – orthogonal, orthonormal vectors, orthogonal set, orthonormal sets of
    I.P.S - theorems & related problems.

5.4 Gram- Schmid orthogonalization process, Bessel's Inequality and Parseval's Identity.

Prescribed Text book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	V. Venkateswara Rao, N. Krishna Murthy.	A text book of Mathematics for B.A/B.ScVol – III. (Pg No: 111-192; 232 – 321 & 339 – 389; 395 – 434).	S-Chand & Co.	2006

Reference Text books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	J.N. Sharma and A. R. Vasistha	Linear Algebra	Krishna PrakashanMandir Meerut-250002.	
2.	Dr. A. Anjaneyulu	A Text Book of Mathematics B.A/B.Sc – Vol III	Deepthi Publications	3rd Edition 2006 - 2007

SEMESTER – V	**Model Paper**	PAPER – VI

COURSE CODE	**: MATT52**	**Time: 3hrs.**
TITLE OF THE PAPER	**: LINEAR ALGEBRA**	**Max. Marks: 75**

SECTION – A

Answer any FIVE of the following questions   **5X5=25M**

1. The set W of ordered triads $(x, y, 0)$ where $x, y \in F$ is a subspace of $V_3(F)$. (CO1, L2)

2. If two vectors are linearly dependent, prove that one of them is a scalar multiple of the

   other.   (CO1, L2)

3. Show that the set { $(1,0,0), (1,1,0),(1,1,1)$ } is a basis of $C^3(C)$. Hence find the coordinates

   of the vector ($3+4i, 6i, 3+7i$) in $C^3(C)$.   (CO2,L4)

4. Describe explicitly the linear transformation T: $R^2 \to R^2$ such that $T(2, 3) = (4, 5)$ and

   $T(1, 0) = (0,0)$ (CO3,L2)

5. Find the rank of the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$.   (CO4,L2)

6. Solve the system $2x_1 - x_2 + x_3 = 0$, $3x_1 + 2x_2 + x_3 = 0$, $x_1 - 3x_2 + 5x_3 = 0$.   (CO4,L2)

7. Show that zero is a characteristic root of a matrix if and only if the matrix is

   singular.   (CO4,L2)

8. State & prove the Triangle Inequality.   (CO5,L2)

SECTION -B

Answer the following questions.   **5X10=50M**

9a) If S, T are the subset of a vector space V (F), then prove that

   i) $S \subseteq T \Rightarrow$ (i) $L(S) \subseteq L (T)$

ii) L (S U T) = L(S) + L(T). (CO1,L2)

(OR)

9b). Let V (F) be a vector space and S = { $\alpha_1, \alpha_2, \alpha_3, \ldots \ldots \alpha_n$ } is a finite subset of non-zero

vectors of V (F).Then S is linear dependent if and only if some vector $\alpha_k \in$ S, $2 \leq k \leq n$,

can be expressed as a linear combination of its preceding vectors**.** (CO1, L2)

10a) State and prove Basis extension theorem. (CO2, L2)

(OR)

10b) Let W be a subspace of a finite dimensional vector space V (F) then

dim V/W = dim V – dim W. (CO2,L2)

11a) Find T (x, y, z) where T : $R^3 \to$ R is defined by T (1 , 1, 1) = 3; T(0, 1 ,-2) = 1;

T(0, 0, 1) = -2. (CO3, L2)

(OR)

11b) State and prove Rank – nullity theorem. (CO3, L4)

12a) Show that the only number λ for which the system x + 2y + 3z = λx, 3x + y + 2z = λy,

2x + 3y + z = λz has non-zero solutions is 6. (CO4,L2)

(OR)

12b) State and prove Cayley – Hamilton theorem. (CO4,L2)

13a) State and prove Cauchy – Schwarz's Inequality. (CO5,L4)

(OR)

13b) Given {(2,1,3), (1, 2, 3), (1, 1, 1)} is a basis of R^3; Construct an orthonormal basis.

(CO5,L4)

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P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified
WITH EFFECT FROM 2019-20

Designs of Sample Surveys

Offered to: BA(EMS) & B.SC (MSCs, MSDS) / STAP51
Course Type: Core (Practical)
Year of Introduction: **Year of Revision: 2021**   **Percentage of Revision: Nil**
Semester: V   **Credits: 1**
No. Hours Taught: 30 hrs. per Semester   **Max.Time:** 2 Hours

Title of the course :		
Course Outcome	**Course: STAP51**	**P.O Mapping**
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO 1	Construct random sample using normal distribution.	PO5
CO 2	Analyze the simple random sampling under with and without replacement	PO5
CO3	Analyze Methods the systematic sampling methods.	PO5
CO 4	compare the various of simple random sampling, Stratified and systematic random sampling	PO5
CO 5	compare the efficiencies of SRS, STRS & SYS sampling Methods	PO5

CO-PO MATRIX

COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
STAP51	CO1					H		
	CO2					H		
	CO3					H		
	CO4					M		
	CO5					M		

1. Construction of random sample using Normal Distribution

2. Construction of SRS when population units are specified under WR & WOR
   Verification of sample mean is an unbiased estimate of the population mean

3. Comparison of efficiency of SRSWR & SRSWOR

4. Determination of sample sizes from strata using
   (i)   Proportional allocation   (ii)   Optimum allocation

5. Computation of variance of estimate of the population mean in stratified random sampling (STRS)

6. Comparison of efficiencies of proportional and optimum allocations with SRSWOR

7. Construction of systematic sample

8. Comparison of precision of systematic sampling, simple random sampling and stratified sampling.

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P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

Statistical Data Analysis using SPSS and Operations Research-I

Offered to: BA(EMS) & B.SC (MSCs) / STAP52
Course Type: Core (Practical)
Year of Introduction: **Year of Revision: 2021**   **Percentage of Revision: Nil**
Semester: V   Paper No. VI   **Credits: 1**
Hours Taught: 30 periods per Semester   **Max.Time: 2** Hours
Course Prerequisites:MS-Excel techniques

Title of the course :		
Course Outcome	**Course: STAP52**	**P.O Mapping**
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO 1	SPPS syntax with some basic notions for developing their own simple programs and visualizing graphics in SPSS.	PO6
CO 2	SPSS Syntax to test the normality and correlation and regression techniques	PO6
CO3	Simplex method of solving linear programming problem (LPP) for finding unbounded, alternate and infeasible solutions	PO5
CO 4	simplex method of Solving linear programming problem (LPP) for Big-M and Two phase methods	PO5
CO 5	simplex method of solving linear programming problem (LPP) for dual simplex methods.	PO5

CO-PO MATRIX								
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
STAP52	CO1						H	
	CO2						H	
	CO3					H		
	CO4					M		
	CO5					M		

Practical No	Theme	Key Topics
SPSS TECHNIQUES		
1	Descriptive Statistics	Data Entry, Frequencies, Descriptive, Cross Tabs, Exploratory, Custom Tables
2	Visual Statistics	Chart Builder, Histogram, Box Plots, Bar charts, Cluster Bar, Stacked Bar, Error bar, Pie chart, Editing graphs and axes
3	Statistical Testing	Parametric Vs Non-Parametric, Logic, Confidence Intervals, Power of the test, Normal Curve, Normality Test, Homogeneity of variance
4	Linear Correlation and Regression	Pearson Correlation, Spearman Correlation, Scatter Plots, Linear Regression.
OPERATION RESEARCH TECHNIQUES		
5	Linear Programming Problem – I	Simplex Method – Minimization and Maximization with all constraints are less than or equal to type
6	Linear Programming Problem – II	Big - M and Two Phase Methods
7	Linear Programming Problem – III	Special cases in simplex method – Degeneracy and Alternative Optima and Unbounded solutions
8	Linear Programming Problem – III	Dual Simplex method – Minimization and Maximaization

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P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

Designs of Sample Surveys

Offered to: BA(EMS) & B.SC (MSCs, MSDS) / STAT51
Course Type: Core (Theory)
Year of Introduction: **Year of Revision:** 2021   **Percentage of Revision:** Nil
Semester: V   **Paper No.** V   **Credits:** 4
No. Hours Taught: 60 Periods. per Semester   **Max.Time:** 3 Hours
Course Prerequisites: Students required knowledge of Mathematics, Counting principles and distributions

Course Description: This course communicates about the different sources of errors in a sample survey and how to control such errors. Sampling Theory deals with SampleSurveys and its superiority over census survey.

Course Objectives:
1)   To enable the students to develop basic knowledge in sampling techniques
2)   To provide understanding in some sampling techniques used for collecting data for required survey's

Learning Outcomes: At the end of the course, the student will
1)   Understand how to draw a sample from population
2)   Find relationship between various estimates of sampling methods
3)   Measure relative changes in efficiencies of various sampling methods.

CourseOutcomes		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	**Programme OutcomesMapping**
CO 1	Develop the basic knowledge in Survey and sampling methods.	PO5
CO 2	Knowing the concept of non-probability sampling methods and their applications.	PO5
CO3	Knowledge of various types of simple random sampling(SRS), their organization and evaluation of summary measures such as Mean, variance and proportion.	PO6
CO 4	know about the concept of stratified random sampling(STRS), comparisons and efficiencies of stratified random sampling(STRS) over simple random sampling(SRS)	PO5
CO 5	Get the knowledge in respect of drawing a Systematic random sampling(SYRS) and presence of linear trend of Systematic random sampling (SYRS)vssimple random sampling (SRS) and Systematic random sampling (SYRS)vsstratified random sampling (STRS).	PO6

CO-PO MATRIX

COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
STAT51	CO1					H		
	CO2					H		
	CO3						M	
	CO4					H		
	CO5						M	

Syllabus
Course Details

Unit	Learning Units	Lecture Hours
I	Concepts of Population and Sample, Basic principles of sample survey, The principles steps in a sample survey, Complete enumeration vs Sampling, Sampling and non-sampling errors, Limitations of sampling, Types of sampling - Non Probability sampling methods, Probability sampling methods.	12
II	Non Random Sampling Methods, Purposive sampling, Quota sampling, Sequential sampling, Cluster sampling.	12
III	Simple Random sampling - SRSWR definition and procedure of selecting a sample, SRSWOR definition and procedure of selecting a sample. Estimates of population – Mean, variance. Variance of - simple mean and simple variance. Advantages and disadvantages	12
IV	Stratified Random Sampling - Construction procedure, Estimates of mean and variance, Advantages. Allocation of sample size and estimates of mean and variance – Proportional, Optimum (Neymann). Comparison of Stratified Random Sampling (STRS) with Simple Random Sampling (SRS), Efficiency of Stratified Random Sampling (STRS) over Simple Random Sampling (SRS) and Determination of number of strata	12

V	Systematic sampling - Construction procedure, Estimates of mean and variance, Advantages and disadvantages. Types - Linear ($N = n \times k$), Circular. In the presence of linear trend, Systematic Random sampling (SYRS) vs - Simple Random sampling (SRS) and Stratified Random Sampling (STRS).	**12**

Text Book

1. S.C. Gupta & V.K. Kapoor. Fundamentals of Applied Statistics,4th Edition, 2007, Sultan Chand & Sons.

   Unit : I   7.3 to 7.7
   Unit : II   7.8.1, 7.14
   Unit : III   7.9.2,7.9.4,7.9.5,7.9.5
   Unit : IV   7.10.1 to 7.10.4,7.10.7,7.10.9
   Unit : V   7.11.1 to 7.11.5

Reference Text Books

1. B.A/B.Sc. Third Year by Telugu Akademi
2. W.G. Cochran. Sampling Techniques, 3rd edition, John wiley& Sons Pvt. Ltd. 1977
3. P. Mukhopadhyay. Applied Statistics, Books& Allied pvt.Ltd., 2011
4. D.Singh&Chowdhary. Theory and Analysis of Sample Survey Designs, John wiley& Sons Pvt. Ltd, 2014

Websites of Interest: **http://onlinestatbook.com/rvls/index.html**

Co-Curricular Activities in the class:
1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples

Max.: 75 Marks   **Min. Pass: 30 Marks**

Designs of Sample Surveys

Section – A

Answer any FIVE of the following   **5 x 5M = 25Marks**

1.   Briefly explain Quota sampling. (Co – 2, L – 2)
2.   Explain Sampling Errors. (Co – 1, L – 2)
3.   Limitations of sampling. (Co – 1, L – 2)
4.   Write the advantages of simple random sampling. (Co – 3, L – 2)
5.   Explain the construction of stratified random sampling. (Co – 4, L – 1)
6.   Explain the advantages of systematic sampling. (Co – 5, L – 1)
7.   Explain proportional allocation. (Co – 4, L – 1)
8.   Explain the construction of simple random sampling. (Co – 3, L – 1)

Section – B

Answer ALL questions   **5 x 10M = 50Marks**

9.   a. Explain basic principles of sampling. (Co – 1, L – 2)

                (OR)

       b. Explain the principles steps in a sample survey. (Co – 1, L – 2)

10.   a. Explain purposive sampling. (Co – 2, L – 2)

                (OR)

       b. Explain Sequential sampling. (Co – 2, L – 2)

11.   a. In SRSWOR, the sample mean square is an unbiased estimate of the population mean

square. (Co – 3, L – 1)

                (OR)

       b. Draw all possible samples of size 2 from the population {5,7,6} under SRSWR.
       Verify that sample mean is an unbiased estimate of the population mean. (Co – 3, L – 3)

12.   a. Show that $V(\overline{y_{st}})_{Ney} \leq V(\overline{y_{st}})_P \leq V(\overline{y_n})_R$. (Co – 4, L – 1)

                (OR)

       b. A sample of 30 students is to be drawn from a population consisting of 300students
       belonging to two colleges A & B. The means and SD's of their marks are given below

	Stratum size N_i	Means	SD's

| A | 200 | 30 | 10 |
| B | 100 | 60 | 40 |

How would you draw the sample using proportional allocation technique. Also calculate $V(\overline{y_{st}})_P$. (Co – 4, L – 3)

13.   a. If the population consists of a linear trend then Show that   (Co – 5, L – 1)

$$V(\overline{y_{st}})_{\square} \leq V(\overline{y_{sys}})_{\square} \leq V(\overline{y_n})_R$$

          (OR)

b. For a small artificial population which exhibits a fairly steady rising trend. Each column
represents a systematic sample and the rows are the strata. Find the variance of the
systematic sample mean. Given that n=3, k=10, N=30.   (Co – 5, L – 3)

Strata	Systematic sample number									
	1	2	3	4	5	6	7	8	9	10
I	0	1	1	2	5	4	7	7	8	6
II	6	8	9	10	13	12	15	16	16	17
III	18	19	20	20	24	23	25	28	29	27

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P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified
Linear Programming Techniques
Offered to: BA(EMS) & B.SC (MSCs) / STAT52
Course Type: Core (Theory)

Year of Revision: 2021	**Percentage of Revision: Nil**
Semester: V **Paper No. VI**	**Credits: 4**
No. Hours Taught: 60 periods per Semester	**Max.Time:** 3 Hours

CourseOutcomes		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	**Programme OutcomesMapping**
CO 1	Develop the basic knowledge in Operation research (O.R.,) and describe the nature, scientific methods and Decision making (O.R.,)	PO5
CO 2	Be able to understand the application of OR and frame the Linear Programming Problem (LPP)	PO5
CO3	graphical method of solving linear programming problem (LPP) for finding unbounded, alternate and infeasible solutions	PO6
CO 4	Simplex method of solving linear programming problem (LPP) for finding, unbounded, alternate and infeasible solutions	PO6
CO 5	Understand the concept of duality in LPP, relation between primal and dual and solve the LPP by using dual simplex method	PO5

CO-PO MATRIX								
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
	CO1					**M**		
	CO2					**H**		
STAT52	**CO3**						**H**	
	CO4						**M**	
	CO5					**M**		

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Operations Research - An overview** Origin, development, Nature and features of O.R. Scientific method and Modelling in O.R. Advantages and limitations of models, General solution methods for O.R. models, Methodology of O.R. Operations Research and Decision Making, Applications, Opportunities and Shortcomings of O.R.	12
II	**Linear Programming Problem – Mathematical formulation and graphical solution** Definition, components, basic assumptions, Mathematical formulation of the problem, Illustrations on mathematical formulation of L.P.P. (two and three variables) L.P.P - graphical solution method (search approach method). Some exceptional cases in graphical method-Alternative optima, unbounded, solution and infeasible solution	12
III	**Linear Programming Problem-Simplex Method-I** General LPP-Objective function, constraints, non-negative restrictions, Solution of LPP, feasible solution and optimum solution, Canonical and Standard forms of LPP. Basic solution-definition, degenerate solution, basic feasible solution. Associated cost vector, improved basic feasible solution, optimum basic feasible solution and net evaluation. The computational procedure- Simplex Algorithm. Simple linear programming problems on 2 and 3 variables using Simples Method	12
IV	**Linear Programming Problem-Simplex Method-II** Artificial Variable Technique(2 and 3 variables only). The Big *M* Method or Method of Penalties. The Two-phase Simplex Method. Special cases in simplex method (2 and 3 variables only) – Degeneracy, Alternative optima, Unbounded solutions and Non existing or infeasible solutions	12
V	**Duality in Linear programming** General primal – Dual pair, formulating a dual problem, Primal- Dual	12

| | pair in Matrix form, Duality and simplex method(2 and 3 variables only). Dual Simplex method (2 and 3 variables only) | |

Text Book:

1. KantiSwarup, P.K.Gupta , Man Mohan,Operations Research, 15th Edition, 2010, Sultan Chand &Sons, New Delhi.

List of Reference Books:

1. Quality,Reliability& Operations Research, First Edition (2010), Published by Telugu Akademi,Hyderabad.
2. Operations Research Theory, Methods and Applications, S.D. Sharma, Himanshu Sharma, improved and enlarged edition, KedarNathRamNath& Co., Meerut.
3. Kirshna's Operations Research, Dr. R. K. Gupta, 27 thEdition , 2010, Krishna PrakashanMedia (P) Ltd., Meerut.
4. Operations Research: Theory and Applications, J.K.Sharma, 5th Edition, 2013, Macmillan.
5. Operations Research: An Introduction, Hamdy. A. Taha, 9th edition ,2010, Prentice Hall.

Websites of Interest:

Co-Curricular Activities in the class:

1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples

Model Question Paper Structure for SEE

Max.: 75 Marks   **Min. Pass: 30 Marks**

Linear Programming Techniques

Model Paper

SECTION A

Answer any FIVE questions.   **5 x 5M=25M**

1. What are the characteristics of a good model for O.R?   (L1,CO1)

2. Define primal and dual problem.   (L1,CO5)

3. Explain graphical procedure in solving linear programming problems.(L2,CO3)

4. Explain the linear programming problem giving two examples.   (L2,CO2)

5. Explain the simplex procedure to solve a LPP.   (L2,CO4)

6. Explain the use of artificial variables in LPP. (L2,CO2)

7. Define the following terms: (i)Basic variable,(ii) basic solution(iii) degenerate basic feasible solution. (L1,CO2)

8. What are the applications of duality theory? (L1,CO5)

SECTION B

Solve any FIVE problems. **5 x10M =50M**

9. (a)Explain the various phases in solving OR problem. (L2,CO1)
(OR)

(b) Explain briefly the applications of O.R. (L2,CO1)

10. (a) Use the graphical method to solve the following L.P.P (L3,CO3)

$$Min\ Z = 1.5x_1 + 2.5x_2$$
$$Subject\ to\ conditions$$
$$x_1 + 3x_2 \geq 3$$
$$x_1 + x_2 \geq 2$$
$$and\ x_1,x_2 \geq 0.$$

(OR)

(b) A company makes 2 kinds of leather belts. Belt A is high quality belt, and belt B is of lower quality. The respective profits are Rs.4.00 and Rs. 3.00 per belt. Each belt of type A requires twice as much time as a belt of type B, and if all belts of type B, the company could make 1000 per day. The supply of leather is sufficient for only 800 belts per day (both A & B combined).Belt A requires a fancy buckle and only 400 per day are available. There are only 700 buckles a day available for belt B. Determine the optimal product mix and solve it by using graphical method.
(L3,CO2)

11. (a) Using simple method to

Minimum $z = x_2 - 3x_3 + 2x_5$

subject to the constraints:

$$3x_2 - x_3 + 2x_5 \le 7,$$
$$-2x_2 + 4x_3 \le 12,$$
$$-4x_2 + 3x_3 + 8x_5 \le 10,$$
$$x_2, x_3, x_5 \ge 0$$

(L3,CO4)

(OR)

(b) Using simplex method to

Maximize $Z = 2x_1 + 4x_2 + x_3 + x_4$

Subject to the constraints
$$x_1 + 3x_2 + x_4 \le 4,$$
$$2x_1 + x_2 \le 3,$$
$$x_2 + 4x_3 + x_4 \le 3,$$
$$x_1, x_2, x_3, x_4 \ge 0$$

(L3,CO4)

12. (a) Use Two - phase simplex method to Maximize $Z = 5x_1 + 2x_2 - 3x_3$

Subject to the constraints:

$$2x_1 + 2x_2 - x_3 \ge 2,$$
$$3x_1 - 4x_2 \le 3,$$
$$x_2 + 3x_3 \le 5,$$
$$x_1, x_2, x_3 \ge 0$$

(L3,CO4)

(OR)

(b) Solve the following LPP

Maximize $Z = 22x_1 + 30x_2 + 25x_3$

Subject to the constraints

$$Z = 22x_1 + 30x_2 + 25x_3$$
$$2x_1 + x_2 \le 100$$
$$2x_1 + x_2 + x_3 \le 100$$
$$x_1 + 2x_2 + 2x_3 \le 100$$
$$x_1, x_2, x_3 \ge 0$$

(L3,CO4)

13. (a) Use duality to solve the following L.P.P.

Maximize $Z = 2x_1 + x_2$

Subject to the constraints

$$x_1 + 2x_2 \leq 10,$$
$$x_1 + x_2 \leq 6,$$
$$x_1 - x_2 \leq 2, \qquad\qquad\qquad\qquad\qquad\qquad \text{(L3,CO5)}$$
$$x_1 - 2x_2 \leq 1,$$
$$x_1, x_2 \geq 0$$

(OR)

(b) Use dual simplex method to solve the following L.P.P.

Minimize $Z = 3x_1 + x_2$

Subject to the constraints

$$x_1 + x_2 \geq 1,$$
$$2x_1 + 3x_2 \geq 2, \qquad\qquad\qquad\qquad\qquad\qquad \text{(L3,CO5)}$$
$$x_1, x_2 \geq 0$$

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada-10

(An Autonomous College under the jurisdiction of Krishna University)

Reaccredited at the level 'A' by the NAAC

College with Potential for Excellence

(Awarded by UGC)

Sl No.	Semester	Course Code	Name Of The Subject	Teaching Hours	Credits
1	**III Semester**	**ENGT01**	**English-III**	4	3

OBJECTIVE: The main objective of this course is to facilitate the learners to acquire the linguistic competence essentially required in a variety of life situations and develop their intellectual, personal and professional abilities.

COURSE OUTCOMES:

At the end of the course, the learners will be able to:

CO 1. Analyze, interpret, appreciate and comprehend the specified text and the contexts in terms of their content, purpose and form. *PO1*

CO 2. Write effectively for a variety of professional and social settings adapting other writers' ideas as they explore and develop their own. *PO3*

CO 3. Speak clearly, effectively and appropriately in a public forum with correct pronunciation, pause and articulation of voice for a variety of audiences and purposes. *PO2*

CO 4. Think critically; convey their own interpretations, perspectives, producing new creative and artistic works following grammatical structures in oral and written assignments. *PO7*

CO-PO MATRIX- ENG T01						
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1		M					
CO2	M						
CO3					H		
CO4	M						
CO5	M						

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF ENGLISH

GENERAL ENGLISH SYLLABUS FOR B.A, B.COM/B.SC COURSES UNDER CBCS

SEMESTER-III

UNIT-I PROSE

1. M.K.Gandhi; Shyness My Shield [from The Story of My Experiments with Truth]
2. Alexis C. Madrigal: Why people Really Love Technology: An INTERVIEW WITH GENEVIEVE BELL

UNIT-II POETRY

1. Gabriel Okara: Once upon a Time
2. Seamus Heaney: Digging

UNIT –III SHORT STORY

1. Jumpa Lahiri: The Interpreter of Maladies
2. Shashi Deshpande: The Beloved C HARIOTEER

UNIT-IV

ONE ACT PLAY-WURZEL FLUMMERY-A.A.MILNE

UNIT -V LANGUAGE ACTIVITY

1. Classroom and LABORATORY Activities
    i. JAM Sessions
    ii. Note Taking
    iii. Reporting for the Media
    iv. Expansion of an idea
2. Classroom Activity
    i. Transformation of Sentences(Simple-Complex-Compound sentences)
    ii. Note Making
    iii. Report Writing
    iv. Writing for the media

Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
IV	MAT T41	CORE	REAL ANALYSIS	100	25	75	6	5

Course Outcomes of MAT T41

S. No	C.O Upon successful completion of this course, students should have the knowledge and skills to:
1	Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate the limit of a bounded sequence.
2	Apply the Ratio, Root, Alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.
3	Calculate the limit and examine the continuity of a function at a point.
4	Understand the consequences of various mean value theorems for differentiable functions.
5	Determine the Riemann integrability and the Riemann-Stieltjes integrability of a bounded function and prove a selection of theorems concerning integration.

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					M		
CO2					H		
CO3							M
CO4						M	
CO5							M
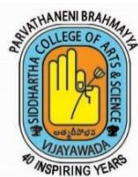
MATHEMATICS	MAT T	2021-2022 onwards	B.Sc. (MPC, MSCS)

<u>REAL ANALYSIS</u>

SEMESTER-IV   **No of Credits: 5**

OBJECTIVE: TO ENHANCE THE ANALYTICAL SKILLS DATA EVALUATIONAL SKILLS AND LOGICAL THINKINGNESS OF THE STUDENT.

UNIT-I: SEQUENCES   (18 Hrs)

1.1   Sequences, Range of sequences, Sub sequences, Bounded sequences

1.2   Limit of a sequences, convergent sequences, Divergent and oscillatory sequences.

1.3   sandwich Theorem and related problems.

1.4   monotonic sequences – theorems – related problems.

1.5   Bolzano Weistrass theorem – related problems.

1.6   Cauchy sequences, Cauchy general principle of convergence – Related problems.

1.7   Cauchy's first theorem of limits, Corollary of Cauchy's first theorem on limits, related problems, Cauchy's second theorem on limits and related problems.

UNIT-II: INFINITE SERIES   (18 Hrs)

2.1   Introduction to Infinite Series, behaviour of the series, Cauchy's general principle of convergence for series,

2.2   series of non-negative terms, Geometric series, Auxiliary series

2.3   Comparison test of first type, second type, Limit Comparison test – Related Problems.

2.4   Cauchy's nth root test – Related problems.

2.5   D'Alembert's ratio test and their problems,

2.6   Alternating series, Leibnitz's test and Problems.

2.7   Absolute convergent series, conditionally convergent series.

UNIT-III: LIMITS AND CONTINUITY   **(18 Hrs)**

3.1   Limit of a function, algebra of limits

3.2   Sandwich theorem, limits at infinity – Problems.

3.3   continuity of a function at a point and on an interval, Algebra of continuous functions,

3.4   Standard theorems on Continuous functions.

3.5   Uniform Continuity definition – theorems – problems.

UNIT-IV: DIFFERENTIATION   **(18 Hrs)**

4.1   Derivative of a function on an interval at a point, Algebra of derivative functions

4.2   Increasing and decreasing functions definition and problems

4.3   Darboux's theorem, Rolle'sTheorem, Lagrange's mean value theorem, Cauchy's mean value theorem and their problems,

UNIT-V: RIEMANN INTEGRATION   **(18 Hrs)**

5.1   Introduction, partitions, lower and upper Riemann sums – Properties and problems.

5.5   Lower and Upper Riemann Integrals, Darboux's theorem, Riemann Integrability

5.7   Necessary and sufficient condition for R-Integrability and problems

5.8   Algebra of integrable functions.

5.10   Fundamental theorem of integral calculus and problems.

5.11   Integral as the limit of a sum and problems.

5.12   Mean value theorems of integral calculus.

Student Activities:

1) **Class-room activities:** Power point presentations, Assignments
2) **Library activities:** Visit to library and preparation of notes for Assignment problems.
3) **Activities in the Seminars, workshops and conferences:** Participation/presentation in seminar/workshop/conference.

CO-CURRICULAR ACTIVITES:

- Quiz Competitions, Seminars
- Group Discussions

WEB LINKS:

https://drive.google.com/file/d/1BPWJAS6NqSxmYt2VMShpEEM4z52_pbW_/view?usp=sharing
https://drive.google.com/file/d/1oFNosFs8JWqB2pKGqpYtgauRI3BGtJBB/view?usp=sharing

Prescribed Text books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	BVSS Sharma, S. AnjaneyaSastry& N. Krishna Murthy	A text book of mathematics for B.A/B.ScVol – II	S-Chand Company Ltd.	2014

Reference books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Dr.A. Anjaneyulu	A text book of mathematics for B.A/B.ScVol – I	Deepthi Publications	2015

SEMESTER – IV

Model Paper

COURSE CODE   **: MAT T**

TITLE OF THE PAPER   **: REAL ANALYSIS**

Time: 3hrs.   **Max. Marks: 75**

Section – A

Answer any FIVE questions   **(5x5=25 marks)**

1. Prove that every convergent sequence is bounded.   (CO1,L2)
2. Prove that a convergence sequence has a unique limit.   (CO1,L2)
3. Test for convergence of $\sum\limits_{n=1}^{\infty} \dfrac{\sqrt{n}}{n^2+1}$.   (CO2,L3)
4. Examine for continuity the function $f(x)=|x|+|x-1|$ at $x=1$ (CO3,L2)
5. If $f(x)=\dfrac{e^{1/x}}{1+e^{1/x}}$ find whether $\underset{x\to 0}{Lt}\, f(x)$ exists or not.   (CO3,L2)
6. Find 'C' of Cauchy's mean value theorem $f(x)=\dfrac{1}{x^2}, g(x)=\dfrac{1}{x}$ on $[a,b]\, a,b>0$ (CO4,L3)
7. Prove that $f(x)=\dfrac{x}{\sin x}$ is increasing in $\left[0,\dfrac{\pi}{2}\right]$ (CO4,L3)
8. Prove that $f(x)=x[x]$ is integrable on $[0,2]$ and find $\int\limits_{0}^{2} x[x]\,dx$ (CO5,L3)

Section – B

Answer ALL questions.   **(5 x 10 = 50 marks)**

Unit – I

9(a).If $S_n = \dfrac{1}{n+1}+\dfrac{1}{n+2}+.....+\dfrac{1}{n+n}$ then show that $\{S_n\}$ is convergent.   (CO1, L2)

(OR)

9(b).State and Prove Cauchy's general principle of convergence for sequences.   (CO1,L2)

Unit – II

10(a).State and Prove D'Alembert's ratio test.   (CO2, L3)

(OR)

10(b).Show that the Series $\sum\limits_{n=1}^{\infty} (-1)^n \left(\sqrt{n^2+1}-n\right)$ is conditionally convergent.   (CO2, L3)

Unit - III

11(a). Prove that if $f : S \to R$ is uniformly continuous then f is continuous in S. Is the converse true? Justify your answer.   (CO3, L2)

(OR)

11(b). If $f : [a,b] \to R$ is continuous on $[a,b]$, then prove that f is bounded on $[a,b]$ and attains its bounds.   (CO3, L2)

Unit - IV

12(a). State and prove Rolle's theorem.   (CO4, L3)

(OR)

12(b). Using Lagrange's theorem show that $x > \log(1+x) > \dfrac{x}{1+x}$.   (CO4, L3)

Unit - V

13(a). Show that $f(x) = 3x + 1$ is integrable on $[1,2]$ and $\int\limits_{1}^{2} (3x+1)dx = \dfrac{11}{2}$ (CO5, L3)

(OR)

13(b). Prove that every continuous function in [a, b] is Riemann Integrable.   (CO5, L3)

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STATISTICS	STAP41	2017-18	B.A.(EMS) & B.Sc. (MSCs)

SEMESTER - IV   **No. of credits : 1**   **PRACTICAL - IV**

<table>
<tr><td colspan="3">Title of the course : Testing of Hypothesis</td></tr>
<tr><td>Course Outcome</td><td>Course: STAP41</td><td>P.O Mapping</td></tr>
<tr><td></td><td>Upon successful completion of this course, students should have the knowledge and skills to:</td><td></td></tr>
<tr><td>CO 1</td><td>Applying the Concept of hypothesis testing for large samples</td><td>PO5</td></tr>
<tr><td>CO 2</td><td>Applying the Concept of hypothesis testing for small samples</td><td>PO5</td></tr>
<tr><td>CO3</td><td>Asses the Association using Yule's, Pearson's and Tchuprow's coefficient of contingency</td><td>PO6</td></tr>
<tr><td>CO 4</td><td>Able to test the hypothesis of distribution free</td><td>PO6</td></tr>
<tr><td>CO 5</td><td>Able to Understand the testing the distribution free Using Excel</td><td>PO5</td></tr>
</table>

<table>
<tr><td colspan="9">CO-PO MATRIX</td></tr>
<tr><td>COURSE CODE</td><td>CO-PO</td><td>PO1</td><td>PO2</td><td>PO3</td><td>PO4</td><td>PO5</td><td>PO6</td><td>PO7</td></tr>
<tr><td rowspan="5">STAP41</td><td>CO1</td><td></td><td></td><td></td><td></td><td>H</td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td>H</td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td>M</td><td></td></tr>
<tr><td>CO4</td><td></td><td></td><td></td><td></td><td></td><td>M</td><td></td></tr>
<tr><td>CO5</td><td></td><td></td><td></td><td></td><td>H</td><td></td><td></td></tr>
</table>

1. Large sample tests for mean(s), proportion(s), Standard deviation(s) and correlation coefficient.
2. Small sample tests for single mean and difference of means and correlation coefficient.
3. Paired t-test.
4. Small sample tests for mean(s), paired t-test and correlation coefficient using MS Excel.
5. Small sample test for single and difference of variances.
6. Small sample test for single and difference of variances using MS Excel.
7. χ^2 – test for goodness of fit and independence of attributes.
8. χ^2 – test for goodness of fit and independence of attributes using MS Excel.
9. Nonparametric tests for single and related samples (sign test and Wilcoxon signed rank test) and one sample runs test.
10. Nonparametric tests for two independent samples (Median test, Wilcoxon Mann Whitney– U test, Wald - Wolfowitz's run test)

List of Reference Books:

1.   B.A/B.Sc. Second Year Statistics(2010) , Telugu Akademi, Hyderabad.
2.   Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
3. Fundamental of Statistics, 2014, S.C.Gupta, Himalaya Publishing House
4. 100 statistical tests

SemestersIV Externalexamination for 50 Marks
(i)   For Continuous evaluation – 10 Marks
(ii)   For examination – 40 Marks

STATISTICS	STAT41	2017-18	B.A. (EMS) & B.Sc. (MSCs)

SEMESTER – IV   **PAPER – IV**   **No. of credits : 3**

Testing of Hypothesis

Title of the course : **Testing of Hypothesis**		
Course Outcome	**Course: STAT41** Upon successful completion of this course, students should have the knowledge and skills to:	**P.O Mapping**
CO 1	Able to apply the concept of hypothesis to illustrate various cases.	PO5
CO 2	Draw the inferences of various large samples.	PO6
CO3	Draw the inferences of various small samples.	PO6
CO 4	Distinguish parametric and non – parametric methods and describe various scales.	PO6
CO 5	Draw the inferences for various non – parametric methods for one and two samples.	PO6

CO-PO MATRIX								
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
	CO1					H		
	CO2						M	
STAT41	**CO3**						M	
	CO4						L	
	CO5						M	

Unit I Testing of hypothesis (12L)
1.1   Concepts of statistical hypotheses,
     1.1.1   Simple,
     1.1.2   Composite,
     1.1.3   Null and
     1.1.4   Alternative hypothesis,
1.2   Critical region,

1.3   Two types of errors,
1.4   Level of significance ,
1.5   power of a test and
1.6   p-value.
1.7   One and two tailed tests,
1.8   Test function (non-randomized and randomized).
1.9   Neyman-Pearson Lemma,
      1.9.1   Critical regions for simple hypotheses, for one parameter.
      1.9.2   Examples in case of Binomial,
      1.9.3   Poisson,
      1.9.4   Exponential and
      1.9.5   Normal distributions and their powers.
1.10 Definition of Likelihood ratio test and
1.11 Properties of LR tests (without proof).
Unit II: Large Sample Tests(12L)
2.1   Sampling of Attributes-
      2.1.1   Test of significance for Single Proportion,
      2.1.2   Difference of proportions,
      2.1.3   confidence intervals for proportion(s) and
      2.1.4   Problems.
2.2   Sampling of Variables-
      2.2.1   Test of significance for Single Mean,
      2.2.2   Difference of Means,
      2.2.3   Confidence intervals for mean(s) and
      2.2.4   Problems.

2.3.   Test of significance for Single Standard deviation,
      2.3.1   Difference of Standard deviations and
      2.3.2   Problems.
Unit III: Small Sample Tests(12L)
3.1   t- test-
      3.1.1   t -Test for single mean,
      3.1.2   Difference of means ,
      3.1.3   Paired t- test for difference of means and
      3.1.4   Test for single correlation coefficient.
3.2   F-test-
      3.2.1   F-test for Equality of two population variances.
3.3 χ^2 -test -
      3.3.1 χ^2 -test for single population variance,
      3.3.2   Goodness of fit and ,
      3.3.3   Test for independence of attributes.
      3.3.3.1 Yates's Correction.
3.4   Fisher's Z- transformation-
      3.4.1   Test of significance for Difference of correlation coefficient(s),
Unit IV: Non-Parametric Methods- I (12L)
4.1   Non-parametric tests-
4.2   their advantages and disadvantages,
4.3   Comparison with parametric tests.
4.4   Measurement scale-
      4.4.1   nominal,

4.4.2　　ordinal,

4.4.3　　interval and

4.4.4　　ratio.

4.5　One sample tests-

4.5.1　　Sign test

4.5.2　　Run test

4.5.2　　Wilcoxon-signed rank test

Unit V:　　　Non-Parametric Methods –II (12L)

5.1　Two independent sample tests:

5.1.1　　Median test,

5.1.2　　Wilcoxon- Mann Whitney U - test,

5.1.3　　Wald-Wolfowitz runs test**.**

5.1.4　　Kruskal Wallis test

5.1.5　　Simple problems

Text Book:

1.　B.A/B.Sc.:(Second　Year)　Statistics-II(2010) ,Statistical Methods and Inference Telugu Akademi, Hyderabad.

Unit I:　Chapter 9:　Section 9.1 - 9.10.

Unit II:　Chapter 11:　Section 11.1 - 11.6.1.

Unit III:　Chapter 12:　Section 12.1-12.7;

　　　　Chapter 13:　Section 13.1-13.4.

Unit IV:　Chapter 14:　Section 14.2, 14.3;

　　　　Chapter 15:　Section 15.1-15.5;

Unit V:　Chapter 16:　Section 16.1-16.4.

2. Fundamentals of Mathematical Statistics, 11th Edition, 2010,S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi.

List of Reference Books:

1.　Goon A.M., Gupta M.K. and Dasgupta B. (2005): Fundamentals of Statistics, Vol. II,

8[th]Edn.World Press, Kolkata.

2.　Kandethody M. Ramachandran and Chris P.Tsokos(2009): Mathematical Statistics with Applications, First Edn, Elsevier, Haryana, India.

3.　ParimalMukhopadhyay(2009), Mathematical Statistics, 3rd Edition, Books & Allied (p) Ltd,Kolkata

4.　Hogg, R.V., Craig, A.T. and Mckean, J.W. (2009): Introduction to Mathematical

Statistics, 6[th]Edn., (6th Impression). Pearson Education.

5.　GibbonsJ.D and SubhabrataChakraborti: Nonparametric Statistical Inference. Marcel Dekker.

Model Paper Structure

Section A: Eight questions are to be set, of these five questions are to be answered.

(5 x 5 = 25 M)

Section B:　Two questions from each unit with internal choice.　　(5 X 10M = 50M)

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE
VIJAYAWADA - 520 010
An autonomous college in the jurisdiction of Krishna University, A.P., India

COMPUTER SCIENCE	CSCP31	2017-2018	B.SC(MPCS/MECS/MSCA/MSCS/CAME/BCA)

SEMESTER – III **Credits: 2**

PROGRAMMING WITH JAVA LAB

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Implementing class, constructor, method overloading, method overriding in java.	PO1,PSO1,PSO2,PSO4
CO2	Implement different types of inheritance and interfaces in a Java program	PO1,PO7, PSO1,PSO2,PSO4
CO3	Implement Multithreading, different types of exception handling mechanisms in Java.	PO1,PO7, PSO1,PSO2,PSO4
CO4	Creating and accessing packages in Java program.	PO1,PO7, PSO1,PSO2,PSO4
CO5	Implementing applets in Java programs	PO1,PO7, PSO1,PSO2,PSO4

List of Exercises

1. Java program to demonstrate the use of Harmonic Series.

2. Java program to display a number of even, odd and sum of even, odd program.

3. Java program to find a sub string in the given string.

4. Java program to arrange the given strings in Alphabetic Order.

5. Java program to implements Addition and multiplication of two Matrices.

6. Java program to demonstrate the use of Constructor.

7. Java program to display a use of method overloading.

8. Java program to demonstrate the use of overriding Method.

9. Java program for single Inheritance.

10. Java program for implementing Interface.

11. Java program on Multiple Inheritance.

12. Java program for to implement Thread, Thread Priority,

13. Java program to demonstrate Exception handling.

14. Java program to demonstrate Applet program.

COMPUTER SCIENCE	CSCT31	2017-2018	B.Sc. (MECS, MPCS, MSCS, MSCA,CAME/BCA)

SEMESTER – III   **CREDITS: 3**

Object Oriented Programming Using JAVA

Total: 60 Hrs

Course Objectives: At the end of this course the student is able to

1. Understand the features of Object Oriented Programming.
2. Understand features of Java programming language.
3. Know how to write and execute java programs in text editors.
4. Apply polymorphism, inheritance, multithreading, exception handling mechanism and packages in real life applications.
5. Write and read data from the files using streams and file handling methods.

COURSE OUTCOMES:

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Understand the concept and underlying principles of Object-Oriented Programming, Understand how object-oriented concepts are incorporated into the Java programming language.	PO1,PO7
CO2	Implement Object Oriented Programming Concepts (class, constructor, overloading, inheritance, overriding) in java.	PO1,PO7
CO3	Use and create inheritance and interfaces in a Java program	PO1,PO7
CO4	Implement Multithreading, exception handling in Java.	PO1,PO7
CO5	Use and create packages and interfaces in a Java program,Use graphical user interface in Java programs, Use of Input/output Streams in java.	PO1,PO7

Syllabus:
UNIT-1   **10 hours**
1.1   FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING
         1.1.1   Introduction
         1.1.2   Object Oriented paradigm
         1.1.3   Basic Concepts of OOP
         1.1.4   Benefits of OOP
         1.1.5   Applications of OOP
         1.1.6   Java features
1.2   **OVERVIEW OF JAVA LANGUAGE**

      3.2.1   Arrays

      3.2.2   One-dimensional arrays

      3.2.3   Creating an array

      3.2.4   Two – dimensional arrays

      3.2.5   Strings

      3.2.6   Wrapper classes

3.3 INTERFACES

      3.3.1   MULTIPLE INHERITANCE : Introduction

      3.3.2   Defining interfaces

      3.3.3   Extending interfaces

      3.3.4   Implementing interfaces

      3.3.5   Assessing interface variables

UNIT-IV   **10 hours**

  1.1   **MULTITHREADED PROGRAMMING**

     1.1.1   Introduction

     1.1.2   Creating Threads

     1.1.3   Extending the Threads

     1.1.4   Stopping and Blocking a Thread

     1.1.5   Lifecycle of a Thread

     1.1.6   Using Thread Methods

     1.1.7   Thread Exceptions

     1.1.8   Thread Priority

     1.1.9   Synchronization

     1.1.10 Implementing the 'Runnable' Interface.

  1.2   **MANAGING ERRORS AND EXCEPTIONS**

     1.2.1   Types of errors

     1.2.2   Compile-time errors

     1.2.3   Run-time errors

     1.2.4   Exceptions

     1.2.5   Exception handling

     1.2.6   Multiple Catch Statements

     1.2.7   Using finally statement

UNIT – V   **16 hours**

  1.1   **APPLET PROGRAMMING**

     1.1.1   Local and remote applets

     1.1.2   Applets and Applications

     1.1.3   Building Applet code

     1.1.4   Applet Life cycle: Initialization state, Running state, Idle or stopped state, Dead state, Display state.

  1.2   **PACKAGES**

     1.2.1   Introduction

     1.2.2   Java API Packages

     1.2.3   Creating Packages

     1.2.4   Accessing a Package

     1.2.5   Using a Package.

  1.3   **MANAGING INPUT/OUTPUT FILES IN JAVA**

     1.3.1   Introduction

     1.3.2   Concept of Streams

     1.3.3   Stream classes

     1.3.4   Byte Stream Classes

     1.3.5   Character Stream classes: Reader stream classes, Writer Stream classes

     1.3.6   Reading and writing files.

Text Books:

   1. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.

Reference Books:
1. Programming in Java by Sachin Malhotra, OXFORD University Press
2. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TATA McGraw-Hill Company.
3. Deitel &Deitel. Java TM: How to Program, PHI (2007)
4. Java Programming: From Problem Analysis to Program Design- D.S Mallik
5. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE:: VIJAYAWADA
TITLE: OBJECT ORIENTED PROGRAMMING USING JAVA

MODEL PAPER

CLASS: B.Sc. (MPCS/MECS/MSCA/MSCS, CAME/BCA)
Course Code: CSCT31   Max. Marks: 75M
Semester: III   Time: 3 Hours

Section-A

ANSWER ANY FIVE QUESTIONS   5x5M=25M

1. Explain structure of java program.(CO1, L2)
2. Define a class and add methods, variables to it and create objects for it. (CO2,L1)
3. Explain constructors in java with example. (CO2,L2)
4. Explain any five string handling methods in java.(CO3, L2)
5. Illustrate implementing interfaces in java with example. (CO3,L2)
6. Illustrate creating threads in java with example .(CO4,L2)
7. Illustrate Arithmetic Exception in java with example.(CO4, L2)
8. Explain byte stream classes in java. (CO5, L2)

Section-B

ANSWER THE FOLLOWING QUESTIONS   5x10M=50M

9. (A) Explain Object Oriented Programming Principles. (CO$_1$,L2)

(**OR)**

(B) Explain Java Buzz words. (CO1, L2)

10. (A) Explain the following with programs (CO2, L2)

   i. Method Overloading   5M
   ii. Abstract classes   5M
                     (OR)

(B) Explain the concept of static members in java with an example. (CO2 ,L2)

11. (A) Explain the concept of final keyword with an example. (CO3,L2)

(**OR)**

(B) List of different types of inheritance in java with examples. (CO3,L4)

(A) Explain life cycle of a thread with neat diagram. (CO4,L2)

(OR**)**

(B) Define Exception. Explain Exception handling mechanism in java with examples

(CO4, L1,L2)

12. (A) Explain creating and accessing package in java with example. (CO5,L2)

(OR)

(B) Define Applet. Explain life cycle of an applet with neat diagram.

(CO5,L1, L2)

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PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-520 010.
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SEMESTER–III/IV   Credits – 3

TITLE OF THE PAPER: HINDI–III   COURSE CODE:HINT0I

HINDI -III   **2018-2019**

COURSE NAME	COURSE OUTCOMES	COURSE OUTCOMES	PO'S
HINT01	CO1	दोहों के द्वारा विद्यार्थियों में समाज सुधारता, मानव मूल्यों बढते हैं।	PO3
	CO2	हिन्दी साहित्य का इतिहास के द्वारा हिन्दी भाषा की प्रामुख्यता और कविताओं की प्रामुख्यता मिल जाती हैं।	PO1
	CO3	समाज कल्याण विषयों के लिए समझकर अपना ज्ञान बढ हो जाते हैं।	PO2
	CO4	समाज में भाषा पर प्रामुख्यता, भाषा में ज्ञान प्राप्त करके , दूसरों से आसानी से संप्रेषित करना सीखेंगे।	PO1
	CO5	सरकारी व्यवस्थाओं को लेख लिखना, भाषा की विशेषता , समाज में सरकारी भाषा सीखकर दूसरों को आदर्शवान बन सकेंगे।	PO6

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1			H				
CO2	L						
CO3		M					
C04	M						
CO5						H	

I. काव्य दीपः

   1. कबीरदास – साखी – 1-10   (Offline Teaching-5 Hours)

   2. सूरदास का बाल वर्णन   (Offline Teaching-4 Hours)

   3. मातृभूमि   (Offline Teaching-5 Hours)

   4. तोडती पत्थर   (Offline Teaching-4 Hours)

   5. गीत फरोश   (Online Teaching-5 Hours)

II. हिन्दी साहित्य का इतिहास :   (Offline Teaching-17 Hours)

   काल विभाजनः   भक्तिकाल :

   वीरगाथा काल की परिस्थितियाँ   1. ज्ञानाश्रयी शाखा – कबीर

   वीरगाथा काल की विशेषताँए   2. प्रेमाश्रयी शाखा – जायसी

III. साधारण निबन्ध :

   1. समाचार पत्र   (Offline Teaching-2 Hours)

   2. बेकारी की समस्या   (Offline Teaching-2 Hours)

   3. कम्प्यूटर   (Online Teaching-2 Hours)

   4. पर्यावरण और प्रदूषण   (Offline Teaching-2 Hours)

   5. साहित्य और समाज   (Online Teaching-2 Hours)

IV. अनुवाद   (Online Teaching-5 Hours)

V. प्रयोजनमूलक हिन्दी :

   1. परिपत्र   (Offline Teaching-2 Hours)

   2. ज्ञापन   (Offline Teaching-2 Hours)

   3. सूचना   (Online Teaching-1 Hours)

Reference Books:

प्रामाणिक आलेखन और टिप्पण

MODEL PAPER

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-520 010.

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

SEMESTER–III/IV   Credits – 3

TITLE OF THE PAPER: HINDI–III   COURSE CODE:HINT0I

No. of Pages: 2	Roll No.:	Max. Marks: 75M
Time: 3 Hrs.	No. of Questions: VII	Pass Min. : 30M

I. *निम्न लिखित पद्यांशों की संदर्भ सहित व्याख्या कीजिए :-*   *L2*   2 X 8 = 16M

   (अ) (i) पाहन पूजे हरि मिलै, तो मैं पूजूँ पहाड ।

          ताते ये चाकी भली, पीस खाय संसार ॥

              अथवा

    (ii) सोभित कर नवनीत लिए ।

         धुटुरूनि चलत रेनु-तन मंडित, मुख दधि लेप किए ॥

         चारू कपोल, लोल लोचन, गोरोचन तिलक दिए ।

         लट-लटकनि मनमत मधुप-गत, मादक मधुहि पिए ॥

         कठुला-कंठ वज्र केहरि-नख, राजत रूचिर हिए ।

         धन्य सूर एको पल इहिं सुख, का सत कल्प जिए ॥

   (आ) (i) हमें जीवनाधार अन्न तू ही देती है,

        बदले में कुछ नहीं किसी से तू लेती है ।

        श्रेष्ठ एक से एक विविध, द्रव्यों के द्वारा,

        पोषण करती प्रेम भाव से सदा हमारा ।

        हे मातृभूमि! उपजे न जो तुझ पर कृषि अंकुर कभी ।

        तो तडप-तडप कर जल मरें जठरानल मे हम सभी ।

अथवा

(ii) गर्मियों के दिन,
     दिवा का तमतमाता रूप,
     उठी झुलसाती हुई लू,
     रूई ज्यों जलती हुई भू,
     गर्द चिनगी छा गई,
         प्रायः हुई दोपहर –
         वह तोडती पत्थर ।

II. *किसी एक कविता का सारांश लिखिए ।*   *L1*   12M
    1. तोडती पत्थर   2. गीत फरोश

III. *(अ)* वीरगाथा काल की विशेषताएँ बताइए ।   *L1*   12M
                        अथवा
     (आ) ज्ञानमार्गी शाखा के प्रवर्तक के रूप में कबीरदास का परिचय दीजिए ।

IV. *किसी एक कवि का परिचय दीजिए ।*   *L1*   5M
    1. सूरदास
    2. सूर्यकांत त्रिपाठी निराला

V. *किसी एक विषय पर निबंध लिखिए ।*   *L2*   10M
    1. समाचार पत्र
    2. साहित्य और समाज

VI. *(अ) गद्यांश पढ़कर निम्न लिखित प्रश्नों का उत्तर दीजिए ।L3*   5 X 1 = 5M

भारत के पश्चिय में राजस्थान नामक राज्य है । यहाँ के लोग बडे वीर और देश व धर्म पर आत्मोत्सर्ग करने वाले होते हैं । पगडी बाँधने का यहाँ पर विशेष रिवाज है । यहाँ पर रेगिस्थान है । यहाँ पर इस्लाम का प्रभाव कम पाया जाता है । पूरब के लोग बंगाली कहलाते हैं । ये लोग अपने सिर पर टोपी नहीं पहनते थे । ये बहुधा कोट, कमीज और बंगाली धोती पहनते हैं । पंजाब और बंगाल के बीच में उत्तर प्रदेश और बिहार है । यहाँ पर सब जातियों के लोग दिखाई पडते हैं ।

प्रश्न:-

1. भारत के पश्चिम में कौन-सा राज्य है?

2. राजस्थान के लोग किस प्रकार के होते है ?

3. पूरब के लोग क्या कहलाते हैं ?

4. बंगाल और पंजाब के बीच कौन-कौन सा राज्य है ?

5. बंगाली के लोग बहुधा क्या पहनते है ?

(आ) प्रयोजनमूलक हिन्दी में कोई एक पत्र लिखिए ।   *L2*   5M

1. परिपत्र   2. ज्ञापन

VII. *हिन्दी में अनुवाद कीजिएः-*   *L2*   10M

Vidyasagar was a very generous and charitable man. From his earliest year he helped the poor and needy to the almost of his power. As a boy at school he often gave the little food to another boy who had none. If one of his fellows fell ill, little Eswar would go to his house, sit by his bed and nurse him. His name become a household word in Bengal. rich and poor, high and low, all loved him alike. No beggar ever asked him for relief invain. He would never have a porter at his gate lest some poor man who wished to see him might be turned away.

Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
II	MATT44	CORE	ABSTRACT ALGEBRA	100	25	75	6	5

Course Outcomes of MATT44

S. No	C.O Upon successful completion of this course, students should have the knowledge and skills to:	
1	Understand concepts of groups and its properties.	
2	Determine subgroups and whether the given subsets of a group are subgroups.	
3	Explain the significance of cosets, normal subgroups and factor groups.	
4	Determine group homomorphisms and isomorphisms.	
5	Find cycles of a given permutations and understand the properties of cyclic groups.	

CO-PO MATRIX						
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2					H		
CO3						M	
CO4							M
CO5							M

1

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE:VIJAYAWADA-10

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

MATHEMATICS	MAT T26	2019 – 20 onwards	B.Sc(MSDS)

<u>ABSTRACT ALGEBRA</u>

SEMESTER-II   **No of Credits: 5**

OBJECTIVES: 1. This course aims to provide a first approach to the subject of algebra, which is one
                            of the basic pillars of modern mathematics.
                        2. The focus of the course will be the study of certain structures called groups,
                             Sub groups, cyclic groups, permutation groups etc..
                        3. Abstract algebra gives to student a good mathematical maturity and enables to
                            build Mathematical thinking and skill.

UNIT-I : GROUPS   (16 hrs)
1.1   Binary Operation, Semi group, Algebraic Structure, Monoid, Cancellation laws, Group
            definition, Abelian group, Elementary Properties
1.2   Finite and Infinite groups with examples, Order of a group with examples
1.3   Addition modulo m – Definition – theorem – Problems
1.4   Multiplication Modulo P – definition- {1, 2, 3,…….p-1} where P is a prime number is a group
            – theorem – Problems
1.5   Order of an element of a group – Definition – Theorems.

UNIT-II: SUB GROUPS   (20 hrs)
2.1   Complex definition, Multiplication of two complexes, Inverse of a complex, subgroup
            definition, Identity and Inverse of a subgroup
2.2   Criterion for a complex to be a subgroup, Criterion for the product of two subgroups to be
            a subgroup

2

2.3   Union and Intersection of subgroups.
2.4   Cosets Definition – Properties of cosets.
2.5   Index of a subgroups of a finite groups, Lagrange's Theorem.

UNIT-III: NORMAL SUBGROUPS   (18 hrs)
3.1   Definition of a normal subgroup, Proper and improper normal subgroups
3.2   Intersection of two normal subgroups, Subgroup of index 2 is a normal subgroup, Simple group
3.3   Quotient group, Criteria for the existence of a Quotient group

UNIT-IV: HOMOMORPHISM   (16 hrs)
4.1   Definition of a Homomorphism, Image of a Homomorphism, Properties of a Homomorphism
4.2   Isomorphism, Automorphism definitions and elementary properties
4.3   Kernel of a homomorphism, Fundamental theorem on homomorphism of groups and Applications
4.4   Inner automorphism, Outer automorphism.

UNIT-V: PERMUTATIONS AND CYCLIC GROUPS   (20 hrs)
5.1   Definition of a permutation group, Equal permutations, Permutation multiplications, Order of a permutation, Inverse of a permutation, Orbits and cycles of permutation
5.2   Transposition, Even and odd permutations – Theorem – Related Problems.
5.3   Cayley's theorem – Related Problems.
5.4   Definition of a cyclic group – Properties of Cyclic group
5.5   Standard theorems on cyclic groups – related problems.

Prescribed Text book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	V.Venkateswara Rao, BVSS Sharma, S.AnjaneyaSastry & Others	A textbook of mathematics for B.A/B.ScVol – I	S-Chand	2015

Reference books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Dr.A. Anjaneyulu	A text book of	Deepthi Publications	2015

		mathematics for B.A/B.ScVol – I		
2	M.L.Khanna	Modern Algebra	Jaya Prakashnadh & Co	2012

SEMESTER – II
Model Paper

COURSE CODE: MATT 26

TITLE OF THE PAPER: ABSTRACT ALGEBRA

Time: 3hrs.   **Max. Marks: 75**

Section – A

Answer any FIVE questions   **5x5=25**

1. In a group G, Show that the inverse of an element is unique. (L1,CO1)
2. H is a non-empty complex of a group G. Show that the necessary and sufficient condition for H to be a sub group of G is $a,b \in H \Rightarrow ab^{-1} \in H$. (L1,CO2)
3. Show that any two left (right) cosets a sub group are either disjoint (or) identical.(L2,CO3)
4. Show that every subgroup of an abelian group is normal. (L3,CO3)
5. Prove that Every Quotient group of an abelian group is abelian. (L2,CO3)
6. If 'f' is a homomorphism of a group G into a group G', then show that the Kernel of f is a normal subgroup of G. (L3,CO3)
7. Use Cayley's theorem to find the regular permutation group isomorphic to the multiplicative group $\{1, -1, i, -i\}$. (L3,CO5)
8. Prove that every cyclic group is abelian. (L2,CO5)

Section – B

Answer ALL questions.   **(5 x 10 = 50)**

Unit - I

9.(a). Prove that the set Z of all integers from an abelian group w.r.t to the operation defined
by a * b = a+b+2 $\forall$ a,b $\in$ z. (L3, CO1)

(OR)

(b).Prove that G = {0,1,2,3,4,5} is an abelian group w.r.t. addition modulo 6.(L3,CO1)

Unit – II

10.(a).Prove that the union of two sub groups of a group G is a sub group of G if and only

if one is contained in the other. (L1,CO2)

(OR)

(b).State and prove Lagrange's theorem on groups. (L1,CO2)

Unit – III

11.(a).If H is a normal subgroup of a group G, then prove that the set of all cosets of H in G is a
group with respect to coset multiplication. (L1,CO3)

(OR)

(b).Prove that H is a normal subgroup of a group G iff product of two right cosets of H is again a
right coset of H. (L1, CO3)

Unit – IV

12.(a).State and Prove Fundamental Theorem of Homomorphism. (L1,CO4)

(OR)

(b).Let 'a' be a fixed element of a group G. Prove that the mapping $f_a : G \to G$ defined by
$f_a(x) = a^{-1}xa \forall x \in G$ is an auto morphism of G. (L2, CO4)

Unit - V

13.(a).Prove that every finite group G is isomorphic to a permutation group. (L1,CO5)

(OR)

(b).Prove that every subgroup of a cyclic group is cyclic. (L1,CO5)

STATISTICS	STAP31	2017-18	B.A.(EMS) & B.Sc. (MSCs)

SEMESTER - III   **No. of credits : 1**   **PRACTICAL - III**

Title of the course :		
Course Outcome	**Course: STAP31** Upon successful completion of this course, students should have the knowledge and skills to:	**P.O Mapping**
CO 1	To Applying the Concept of curve fitting by the method of least squares	PO5
CO 2	To Applying the power curve by using the method of least squares	PO5
CO3	To Asses the Association using Yule's,Pearson's,Tchuprow's	PO5
CO 4	Able to Obtain the Relation Between Two variables	PO5
CO 5	Able to Understand the Relation Between Two variables Using Excel	PO6

COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO-PO MATRIX							
STAP31	**CO1**					H		
	CO2					H		
	CO3					M		
	CO4					M		
	CO5						H	

1. Fitting of straight line and parabola by the method of least squares.
2. Fitting of straight line and parabola by the method of least squares using MS Excel.
3. Fitting of power curves of the type $y = ax^b$, $y = ab^x$ and $y = a\,e^{bx}$ by the method of least squares.
4. Fitting of power curves of the type $y = ax^b$, $y = ab^x$ and $y = ae^{bx}$ by the method of least squares using MS Excel.
5. Computation of Yule's coefficient of association.
6. Computation of Pearson's, Tchuprow's coefficient of contingency.
7. Computation of correlation coefficient and regression lines for ungrouped data.
8. Computation of correlation coefficient, forming regression lines for ungrouped data.
9. Computation of correlation coefficient, forming regression lines for grouped data.
10. Computation of correlation coefficient, forming regression lines using MS Excel.

List of Reference Books:
1. B.A/B.Sc. Second Year Statistics(2010) , Telugu Akademi, Hyderabad.
2. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
3. Fundamental of Statistics, 2014, S.C.Gupta, Himalaya Publishing House

Structure of the Practical Examination

Semester III   Internal examination for 50 marks
(i)   For Continuous evaluation – 10 Marks
(ii)   For examination – 40 Marks

PARVATHANENIBRAHMAYYASIDDHARTHACOLLEGE OF ARTS & SCIENCE VIJAYAWADA - 520 010
An AutonomousCollege in the jurisdiction of KrishnaUniversity, Machilipatnam. A.P., India

| STATISTICS | STAT31 | 2017-18 | B.A (EMS) & B.Sc. (MSCs) |

SEMESTER – III   **PAPER – III**   **No. of credits : 3**

Statistical Methods and Theory of Estimation

Title of the course:		
Course Outcome	**Course: STAT31** Upon successful completion of this course, students should have the knowledge and skills to:	**P.O Mapping**
CO 1	Apply the concepts of correlation and Regression Analysis	PO5
CO 2	Understand the concepts of fitting of Straight line, Quadratic and Exponential curves (Equations)	PO5
CO3	To Obtain the Knowledge of Exact Sampling Distributions	PO5
CO 4	Understanding to obtain a Good Estimator	PO5
CO 5	Estimate the MLE's and method of moments to obtain estimators	PO6

CO-PO MATRIX								
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
STAT31	**CO1**					H		
	CO2					H		
	CO3					M		
	CO4					H		
	CO5						L	

Unit I: Correlation & Regression Analysis (12L)
1.1   Correlation Analysis
1.2   Population correlation coefficient and
1.3   its properties. Bivariate data,
1.4   Scattered diagram,
1.5   Karl Pearson's correlation coefficient,
1.6   Computation of correlation coefficient for grouped data.
1.7   Spearman's rank correlation coefficient and its properties.

1.8   Regression Analysis
1.9   Simple linear regression,
1.10   Correlation verses regression.
1.11   Standard error of Estimate,
1.12   Properties of regression coefficients,
1.13   Correlation ratio.
1.14   Concepts of partial and
1.15   Multiple correlation coefficients (only for three variables).

Unit II: Curve fitting and Attributes (12L)

2.1   Curve fitting:
   2.1.1   Principle of least squares,
2.2   Fitting of straight line,
2.3   Quadratic,
2.4   Exponential and
2.5   Power curves.
2.6   Attributes- Definition,
2.7   Analysis of categorical data,
2.8   independence and association of attributes
   2.8.1   partial association of attributes,
2.9   various measures of association (Yule's) for two way data and
   2.9.1   coefficient of contingency -Pearson and
   2.9.2   coefficient of contingency-Tcherprow,
   2.9.3   coefficient of colligation**.**

Unit III: Exact Sampling Distributions and Order Statistics (12L)

3.1   Concepts of population,
3.2   parameter,
3.3   random sample,
3.4   statistic,
3.5   sampling distribution and
3.6   Standard error.
3.7   Standard error of sample mean(s) and
3.8   sample proportion(s).
3.9   Simple problems on standard error of sample mean and sample proportion
3.10   Exact sampling distributions- Statement and properties of
   3.10.1 χ^2 ,
   3.10.2   t and
   3.10.3   F distributions and
3.11   their interrelationships.
3.12   Independence of sample mean and variance in random sampling from normal distributions.
3.13   Order Statistics- Definition,
3.14   Distribution function and probability density function of
   3.14.1   Maximum and
   3.14.2   Minimum order statistics.
3.15   Simple applications- continuous uniform and exponential distributions.

Unit IV: Theory of Estimation-I (12L)

4.1   Point estimation of a parameter,
4.2   concept of bias and
4.3   Mean square error of an estimate.
4.4   Criteria of good estimator-

4.4.1   Consistency,
        4.4.2   Unbiasedness,
        4.4.3   Efficiency and
        4.4.4   Sufficiency with examples.
4.5   Statement of Neyman's Factorization theorem–Simple Applications.
4.6   Lower bound for variance of estimator,
        4.6.1   Regularity conditions,
        4.6.2   Cramer –Rao inequality – Statement and proof –
        4.6.3   Simple problems.

Unit IV: Theory of Estimation-II   (12L)
5.1   Methods of Estimation-
        5.1.1   Estimation by method of moments,
        5.1.2   Maximum likelihood (ML),
        5.1.3   Statements of asymptotic properties of MLE.
5.2   Distinction between point estimation and interval estimation -
5.3   Confidence interval and confidence limits –
        5.3.1   Construction of confidence intervals for parameters of Poisson,
        5.3.2   Normal and
        5.3.4   Exponential distribution.

Text Books:

1.   Fundamentals of Mathematical Statistics, 11th Edition, 2010,
       S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi
       Unit I:Chapter10& 11: Section   10.1-10.7.4; 11.21-11.2.5.
       Unit II: Chapter 13:   Section 13.1-13.7.2.
       Unit III: Chapter 9:   Section 9.15, 9.15.1 - 9.15.2.
       Unit IV: Chapter 17:   Section 17.3, 17.3.1;   .
       Unit V: Chapter 17:   Section 17.6,17.6.1, 17.6.3, 17.7,17.7.1
2.   B.A/B.Sc.:(Second   Year)   Statistics-II(2010) ,Statistical Methods and Inference Telugu
       Akademi, Hyderabad.
       Unit I: Chapter 3: Section   3.1 - 3.8.
       Unit II: Chapter 2: Section   2.7-2.9.
       Unit III: Chapter 5: Section   5.1,5.2;
        Chapter 6: Section   6.1, 6.2, 6.2.2, 6.2.4, 6.3, 6.3.1, 6.3.3, 6.3.4, 6.4, 6.4.1,
                6.4.3, 6.4.4 ,6.5, 6.6,6.7.
       Unit IV: Chapter 7: Section   7.1,7.2,7.3,7.3.1-7.3.4,7.4.
       Unit V: : Chapter 8: Section   8.1,8.2,8.3,8.4, 8.4.2,
       List of Reference Books:
       1. Goon A.M., Gupta M.K. and Dasgupta B. (2005): Fundamentals of Statistics, Vol. II,
          8thEdn.World Press, Kolkata.
       2. Kandethody M. Ramachandran and Chris P.Tsokos(2009): Mathematical Statistics with
          Applications, First Edn, Elsevier, Haryana, India.
       3. ParimalMukhopadhyay(2009), Mathematical Statistics, 3rd Edition, Books & Allied (p)
          Ltd, Kolkata.
       4. Hogg, R.V., Craig, A.T. and Mckean, J.W. (2009): Introduction to Mathematical

Statistics, 6thEdn., (6th Impression). Pearson Education.

5. Hogg, Tanis, Rao. Probability and Statistical Inference.7thEdn.Pearson Publication.

Model Paper Structure

Section A: Eight questions are to be set, of these five questions are to be answered.

(5 x 5 = 25 M)

Section B: Two questions from each unit with internal choice.   (5 X 10M = 50M)

Course Code : TEL T01

COURSE NAME	COURSE OUT COMES NO	COURSE OUT COMES	PO NO.
B.A, BBA, BBA (BA) B.COM (GEN), B.COM (CA), B.SC (MPCS), B.SC (BZC), B.SC(MECS), B.SC (MSCA)	CO 1	ప్రాచీనపద్యభాగంగతవైభవాన్ని ప్రవర్తనలనుతెలియజేయడంవలనమననాగరికతసంస్కృతితెలుసుకోవడానికి అవకాశం:	5
B.A, BBA, BBA (BA) B.COM(GEN)B.COM (CA), B.SC(MPCS), B.SC(BZC), B.SC(MECS), B.SC(MSCA)	CO 2	నూతనఆలోచనలుకలిగివాటినివ్యక్తీకరించినట్లయితే దాని వలన ప్రయోజనం	1
	CO 3	గ్రహించవలసినది సులభంగాగ్రహించితనభావాల్ని వ్యక్తీకరించేందుకు ఉపయోగపడటం	2
	CO 4	భాషలోని లయ సౌందర్యం అవగాహన చేసుకుని ఆచరించేందుకు సహకరించటం	2
	CO 5	వినడానికి వినసంపైన మాటల పొందిగా ఇందులో కనిపిస్తుంది	2

CO – PO MATRIX

Course Code : TEL T01

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2	L						
CO3		L					
CO4		L					
CO5		L					

Telugu	TELT01	2019-20	B.A,B.Sc,,B.Com,B.Com Computers, Appilications, B.Com E-commerce,BBA,BBABA,B.Com TPP,BCA

SYLLABUS

semester –III & IV   credits: 3

అభ్యసన ఫలితాలు

CO 1 ప్రాచీన పద్యభాగం గత వైభవాన్ని ప్రవర్తనలను తెలియజేయడం వలన మన నాగరికత
సంస్కృతి తెలుసుకోవడానికి అవకాశం:

CO 2 : నూతన ఆలోచనలు కలిగి వాటిని వ్యక్తీకరించినట్లయితే దాని వలన ప్రయోజనం

CO 3 : గ్రహించవలసినది సులభంగా గ్రహించి తన భావాల్ని వ్యక్తీకరించేందుకు
ఉపయోగపడటం

CO 4 : భాషలోని లయ సౌందర్యం అవగాహన చేసుకుని ఆచరించేందుకు సహకరించటం

CO 5: వినడానికి వినసంపైన మాటల పొందిగా ఇందులో కనిపిస్తుంది

ప్రాచీన కవిత్వం

1. వామనవతారం   -పోతన

 (శ్రీ మహా భాగవతం ఎనిమిదవ స్కంధం 582వ పద్యం నుండి 621)

2.శాలివాహన విజయం కొరవి గోపరాజు

(సింహాసనద్వాత్రింశికప్రథమ శ్వాసం 115 వ పద్యము నుండి 165 వ పద్యం వరకు)

3.ఆధునిక కవిత్వం

   హరిజన శతకము   -కుసుమ ధర్మన్న

    వంటిల్లు   -విమల

గద్యభాగం / వ్యాస సంపుటి

1. అభి వ్యక్తి నైపుణ్యాలు   - సుబ్బారావు

 2. వ్యక్తిత్వ వికాసం   -ఆచార్య రాచపాలెం చంద్రశేఖరరెడ్డి

వ్యాకరణం

చందస్సు : ఉత్పలమాల, చంపకమాల,, శార్దూలం, కందం, తేటగీతి ,ఆటవెలది ,సీసం

అలంకారాలు : శబ్దాలంకారాలు, ఉపమా ,,ఉప్రేక్ష, రూపక ,స్వభావక్తి ,అతిశయోక్తి ,

              అర్ధాంతరన్యాసాలంకారాలు

Telugu	TELT01	2019-20	B.A,B.Sc,,B.Com,B.Com Computers, Appilications, B.Com E-commerce,BBA,BBABA,B.Com TPP,BCA

MODEL PAPER

semester –III & IV   credits: 3

1.వామనవతార ఘట్టాన్ని విశ్లేషించండి   (లేదా)

 శాలివాహన విజయం పాఠ్యభాగ సారాంశం తెలపండి   15M

2.హరిజన శతకం ద్వారా కుసుమ ధర్మన్న ప్రబోధం విశ్లేషించండి (లేదా)   15M

  విమల వంటిల్లును వర్ణించిన వైఖరి వివరించండి

3.ఈ క్రింది వానిలో రెండింటికి సందర్భ సహిత వ్యాఖ్యలు రాయండి   2X5=10M

     1.మాట తిరగలేరు మానవధనులు

     2. ధరణి ఏటి పుణ్య చరితుడగును

     3. మాయ బుద్ధి చూడ మచ్చుకైనను లేదు

     4.ఇంట్లో అమ్మలంతా ఇక్కడే స్థిలయ్యారు

4. ఈ క్రింది వానిలో మూడింటికి సమాధానాలు రాయండి   3X5 =15M

    1.వామన మూర్తి విశ్వరూపాన్ని పోతన వర్ణించిన విధానం తెలపండి

    2. విక్రమార్కుని ఇంద్రుడు సింహాసనాన్ని బహుకరించిన విధానం తెలపండి

    3.పాటుపడుటట పరుగుచేటు కాదన్నాడు కుసుమ ధర్మన్న వివరణ

    4. వంటిల్లు సందేశాన్ని సంక్షిప్తంగా రాయండి

5. వ్యక్తిత్వ వికాసం విశిష్టతను తెలియజేయండి   (లేదా)

   అవి వ్యక్తి నైపుణ్యాలను విశ్లేషించండి   10M

6. ఈ క్రింది పద్య పాదానికి ఘన విభజన చేసి ఏ పద్య పాదము తెలిపి యతిప్రాసనను 5M
   గుర్తించండి

   రవిబింబం ఉపమావింప చాత్రం మగు చత్రం భయ్ శిరోరత్నమై   (లేదా)

   శార్దూల పద్య పాదానికి ఘన విభజన చేసి యతిప్రాసులు గుర్తించండి

7. ఈ క్రింది పద్యంలోని అలంకారాన్ని గుర్తించి సమన్వయం చేయండి   5M

      ఆదిన్ శ్రీపతి కొప్పుపై తనువుపై సంస్తోతరియంటుపై

      పాదాబ్జంటులపై కపోతలటిపై పాలిండ్లపై నూతన

      మర్యాదం చందు కరంటు క్రిందగుట మీద నా కరం బొటమే కరం భూమి

      రాజ్యము దీర్ఘ్యమున్ సతతమే కాయంటు నా పాయమే   (లేదా)

      ఉత్ప్రేక్ష అలంకారమును సోదాహరణంగా వివరించండి

Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
II	MAT T21B	CORE	REAL ANALYSIS	100	30	70	6	5

Programme Outcomes

S. No	P.O
	At the end of the Programme the student will be able to:
1	Demonstrate the ability to use mathematical skills such as formulating and tackling mathematics related problems and identifying and applying approximate physical principles and methodologies to solve a wide range of problems associated with mathematics.
2	Apply the underlying unifying structures of mathematics and the relationships among them.
3	Investigate and apply mathematical problems and solutions in variety of contexts related to science and technology, business and industry.

Course Outcomes of MAT T21B

S. No	C.O Upon successful completion of this course, students should have the knowledge and skills to:	Mapping
1	Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate the limit of a bounded sequence.	L2, PO –1,2
2	Apply the Ratio, Root, Alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.	L3, PO – 1
3	Calculate the limit and examine the continuity of a function at a point.	L2,PO – 1
4	Understand the consequences of various mean value theorems for differentiable functions.	L3, PO – 1
5	Determine the Riemann integrability and the Riemann-Stieltjes integrability of a bounded function and prove a selection of theorems concerning integration.	L3, PO – 1
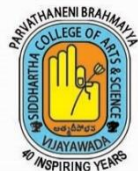
MATHEMATICS	MAT T21B	2021-2022 onwards	B.A(EMS), B.Sc. (MPC, MPCS, MECS, CAME, CAMS, MSCS)

REAL ANALYSIS

SEMESTER-II   **No of Credits: 5**

OBJECTIVE: TO ENHANCE THE ANALYTICAL SKILLS DATA EVALUATIONAL SKILLS AND LOGICAL THINKINGNESS OF THE STUDENT.

UNIT-I: SEQUENCES   (18 Hrs)

1.1   Sequences, Range of sequences, Subsequences, Bounded sequences

1.2   Limit of a sequences, convergent sequences, Divergent and oscillatory sequences.

1.3   sandwich Theorem and related problems.

1.4   monotonic sequences – theorems – related problems.

1.5   Bolzano Weistrass theorem – related problems.

1.6   Cauchy sequences, Cauchy general principle of convergence – Related problems.

1.7   Cauchy's first theorem of limits, Corollary of Cauchy's first theorem on limits, related problems, Cauchy's second theorem on limits and related problems.

UNIT-II: INFINITE SERIES   (18 Hrs)

2.1   Introduction to Infinite Series, behaviour of the series, Cauchy's general principle of convergence for series,

2.2   series of non-negative terms, Geometric series, Auxiliary series

2.3   Comparison test of first type, second type, Limit Comparison test – Related Problems.

2.4   Cauchy's nth root test – Related problems.

2.5   D'Alembert's ratio test and their problems,

2.6   Alternating series, Leibnitz's test and Problems.

2.7   Absolute convergent series, conditionally convergent series.

UNIT-III: LIMITS AND CONTINUITY   (18 Hrs)

3.1   Limit of a function, algebra of limits

3.2   Sandwich theorem, limits at infinity – Problems.

3.3   continuity of a function at a point and on an interval, Algebra of continuous functions,

3.4   Standard theorems on Continuous functions.

3.5   Uniform Continuity definition – theorems – problems.

UNIT-IV: DIFFERENTIATION   (18 Hrs)

4.1   Derivative of a function on an interval at a point, Algebra of derivative functions

4.2   Increasing and decreasing functions definition and problems

4.3   Darboux's theorem, Rolle'sTheorem, Lagrange's mean value theorem, Cauchy's mean value theorem and their problems,

UNIT-V: RIEMANN INTEGRATION   (18 Hrs)

5.1   Introduction, partitions, lower and upper Riemann sums – Properties and problems.

5.5   Lower and Upper Riemann Integrals, Darboux's theorem, Riemann Integrability

5.7   Necessary and sufficient condition for R-Integrability and problems

5.8   Algebra of integrable functions.

5.10   Fundamental theorem of integral calculus and problems.

5.11   Integral as the limit of a sum and problems.

5.12   Mean value theorems of integral calculus.

Student Activities:

1) **Class-room activities:** Power point presentations, Assignments

2) **Library activities:** Visit to library and preparation of notes for Assignment problems.

3) **Activities in the Seminars, workshops and conferences:** Participation/presentation in seminar/workshop/conference.

CO-CURRICULAR ACTIVITES:

- Quiz Competitions, Seminars
- Group Discussions

WEB LINKS:

https://drive.google.com/file/d/1BPWJAS6NqSxmYt2VMShpEEM4z52_pbW_/view?usp=sharing
https://drive.google.com/file/d/1oFNosFs8JWqB2pKGqpYtgauRI3BGtJBB/view?usp=sharing

Prescribed Text books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	BVSS Sharma, S. AnjaneyaSastry& N. Krishna Murthy	A text book of mathematics for B.A/B.ScVol – II	S-Chand Company Ltd.	2014

Reference books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Dr.A. Anjaneyulu	A text book of mathematics for B.A/B.ScVol – I	Deepthi Publications	2015

SEMESTER – II
Model Paper

COURSE CODE   : MAT TT21B

TITLE OF THE PAPER   : REAL ANALYSIS

Time: 3hrs.   **Max. Marks: 70**

Answer ALL Questions

SECTION – A (5 x 4 = 20 Marks)

1. (a) Prove that every convergent sequence is bounded.   (CO1,L1)

    (OR)

    (b) Prove that a convergence sequence has a unique limit.   (CO1,L1)

2. (a) If $\sum U_n$ converges then show that $\lim_{x \to \infty} U_n = 0$ (CO2,L1)

    (OR)

    (b) Test for convergence of $\sum_{n=1}^{\infty} \dfrac{\sqrt{n}}{n^2 + 1}$ (CO2,L1)

3. (a) Prove that $\lim_{x \to 0} \dfrac{3x + |x|}{7x - 5|x|}$ does not exist.   (CO3,L1)

    (OR)

    (b) If $f(x) = \sin \dfrac{1}{x}, \ \forall x \in R - \{0\}$. Prove that $\lim_{x \to 0} \sin \dfrac{1}{x}$ does not exist.   (CO3,L1)

4. (a) Find 'C' of Cauchy's mean value theorem $f(x) = \dfrac{1}{x^2}, g(x) = \dfrac{1}{x}$ on $[a,b] \, a,b > 0$ (CO4,L2)

    (OR)

    (b) Prove that $f(x) = \dfrac{x}{\sin x}$ is increasing in $\left[0, \dfrac{\pi}{2} \right]$ (CO4,L2)

5. (a) If $f(x) = x$ on [0, 1] and $P = \left\{ 0, \dfrac{1}{4}, \dfrac{2}{4}, \dfrac{3}{4}, 1 \right\}$ compute L(p,f) and U(p,f).   (CO5,L2)

    (OR)

    (b) Prove that every constant function is Riemann integrable on [a, b].   (CO5,L2)

Answer ALL Questions

SECTION – B (5 x 10 = 50 Marks)

6. (a) If $S_n = \dfrac{1}{n+1} + \dfrac{1}{n+2} + \dots + \dfrac{1}{n+n}$ then show that $\{S_n\}$ is convergent.   (CO1, L2)

    (OR)

    (b) State and Prove Cauchy's general principle of convergence for sequences.   (CO1,L2)

(P.T.O)

7. (a) State and Prove D'Alembert's ratio test. (CO2,L3)

(OR)

(b) Show that the Series $\sum_{n=1}^{\infty}(-1)^n\left(\sqrt{n^2+1}-n\right)$ is conditionally convergent. (CO2,L3)

8. (a) Prove that if $f : S \rightarrow R$ is uniformly continuous then f is continuous in S. Is the converse true? Justify your answer. (CO3,L2)

(OR)

(b) Examine for continuity the function $f(x)=|x|+|x-1|$ at $x=1$ (CO3,L2)

9. (a) State and Prove Rolle's Theorem. (CO4,L3)

(OR)

(b) Show that $\dfrac{v-u}{1+v^2} < \tan^{-1}v - \tan^{-1}u < \dfrac{v-u}{1+v^2} \; for \, 0 < u < v$. Hence deduce that

$\dfrac{\pi}{4}+\dfrac{3}{25} < \tan^{-1}\dfrac{4}{3} < \dfrac{\pi}{4}+\dfrac{1}{6}$ (CO4,L3)

10. (a) Show that $f(x)=3x+1$ is integrable on $[1,2]$ and $\int_{1}^{2}(3x+1)dx = \dfrac{11}{2}$ (CO5,L3)

(OR)

(b) Prove that every continuous function in [a, b] is Riemann Integrable. (CO5,L3)

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P. B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA-10.
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Semester II	Course Code	Course Title	Hours	Credits
BSC(MPCS/MECS/CAME/MSCS /CAMS/CSCS/BCA)	CSCP21B	Data Structures Lab	30	1

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	implement stacks, queues using arrays and linked lists.	PO1, PSO1, PSO2, PSO4
CO2	Write program for conversion from infix to postfix.	PO1, PSO1, PSO2, PSO4
CO3	implement different sorting and searching techniques.	PO 7, PSO1, PSO2, PSO4
CO4	Construct binary trees and binary search trees.	PO 1, PSO1, PSO2, PSO4
CO5	implement binary tree and Graph traversals.	PO1, PO 7, PSO1, PSO2, PSO4

Lab Experiments List

Cycle - I

Week 1: Write a program to read 'N' numbers of elements into an array and also   perform the following operation on an array

- Add an element at the beginning of an array
- Insert an element at given index of array
- Update a element using a values and index
- Delete an existing element

Week 2: Write Program to implement the Stack operations using an array.

Week 3: Write a program using stacks to convert a given infix expression to postfix.

Week 4: Write a program for arithmetic expression evaluation.

Week 5: Write Program to implement the Stack operations using Linked List.

Week 6: Write Program to implement the Queue operations using an array.

Week 7: Write Program to implement the Queue operations using Liked List.

Week 8: Write Program to implement circular Queue operations using an array.

Cycle - II

Week 9: Write a program to implement de-queues.

Week 10: Write a program to implement single linked list.

Week 11: Write a program to implement double linked list.

Week 12: Write a program for Binary Search Tree Traversals.

Week 13: Write a program to search an item in a given list using the following Searching   Algorithms

- Linear Search

- Binary Search.

Week 14: Write a program for implementation of the following Sorting Algorithms

- Bubble Sort

- Insertion Sort

- Merge sort

Week 15: Write a program for implementation of the following graph traversals.

- BFS

- DFS

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P. B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA-10.
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Semester-II	Course Code	Course Title	Hours	Credits
B.Sc. (CAMS / CAME / MSCS / CSCS / MPCS / MECS/), BCA	CSCT21B	Data Structures	60	4

Course Objectives

To introduce the fundamental concept of data structures and to emphasize the importance of various data structures in developing and implementing efficient algorithms.

Course Outcomes:

Course Outcome No	Upon successful completion of the course, student will be able to:	Program Outcome No
CO1	Learn the concepts of ADT and understand analysis of algorithms	PO1, PSO1, PSO2, PSO4
CO2	Understand available Data Structures for data storage and processing.	PO1, PSO1, PSO2, PSO4
CO3	Learn stacks, queues and their applications	PO1, PSO1, PSO2, PSO4
CO4	Understand trees, graphs and implement their operations	PO1, PO7, PSO1, PSO2, PSO4
CO5	Develop ability to implement different Sorting and Search methods	PO1, PO7, PSO1, PSO2, PSO4

UNIT – I: **11Periods**

Introduction to Data Structures: Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types, Data Structure and Structured Type, Atomic Type, Difference between Abstract Data Types, Data Types, and Data Structures, Refinement Stages.

Principles of Programming and Analysis of Algorithms: Software Engineering, Program Design, Algorithms, Different Approaches to Designing an Algorithm, Complexity, Big 'O' Notation, Algorithm Analysis, Recursion.

UNIT – II: **11Periods**

Linked Lists: Introduction to Lists and Linked Lists, Basic Linked List Operations, Doubly Linked List, Circular Linked List, Atomic Linked List, Linked List in Arrays, Linked List versus Arrays

UNIT – III: **14Periods**

Stacks: Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacks through Arrays, Representation of Stacks through Linked Lists, Applications of Stacks, Stacks and Recursion

Queues: Introduction, Queue as an Abstract data Type, Representation of Queues, Circular Queues, Double Ended Queues- Deques, Priority Queues, Application of Queues

UNIT – IV: **10Periods**

Binary Trees: Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Counting Number of nodes in Binary Trees, Applications of Binary Tree

UNIT – V: **14Periods**

Searching and sorting: Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, searching – An Introduction, Linear or Sequential Search, Binary Search, Indexed Sequential Search

Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Shortest Path, Application of Graphs.

BOOKS:

- "Data Structures using C", ISRD group Second Edition,TMH
- Data Structures through C", YashavantKanetkar, BPBPublications
- "Data Structures Using C" Balagurusamy E.TMH

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

   A.   Measurable

   1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual andchallenging)
   2. Student seminars (on topics of the syllabus and related aspects (individualactivity))
   3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups asteams))
   4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

   B.   General

   1. Group Discussion

   2. Others

   RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

   Some of the following suggested assessment methodologies could be adopted;

   1. The oral and written examinations (Scheduled and surprise tests),

   2. Closed-book and open-book tests,

   3. Programming exercises,

4. Practical assignments and laboratory reports,

5. Observation of practical skills,

6. Individual and group project reports.

7. Efficient delivery using seminar presentations,

8. Viva voce interviews.

9. Computerized adaptive testing, literature surveys and evaluations,

10. Peers and self-assessment, outputs form individual and collaborative work.

TITLE: DATA STRUCTURES   COURSE CODE:CSCT21B

SECTIONS: B.Sc. (CAMS / CAME / MSCS / CSCS / MPCS / MECS /BCA)   SEMESTER: II

TIME: 3 Hrs.   MAX: 75M

SECTION –A

ANSWER ANY <u>FIVE</u> QUESTIONS   **5 X 5 =25 M.**

1. What is an ADT? Explain with an example. **{CO1, L2}**
2. Explain about algorithm analysis. **{CO1, L2}**
3. Distinguish between linked lists and arrays. **{CO2, L2}**
4. Evaluate the postfix expression **2 3 1 * + 9 -. {CO3, L5}**
5. Explain about min and max priority queues**. {CO3, L2}**
6. Construct binary tree from the following in order and pre order traversals
    In order: D B E A F C

    Pre order: A B D E C F {**CO4, L3**}

7. Explain various representations of graphs with your own example. **{CO5, L2}**
8. Develop a C program for linear search. **{CO5, L3}**

SECTION – B

ANSWER ALL THE QUESTIONS   **5 X 10 =50 M.**

9 A) Explain   about Data structure, structured type and atomic type. **{CO1, L2}**

(Or)

   B) Explain about Time Complexity and Space Complexity. **{CO1, L2}**

10 A) Explain about inserting and deleting a node in double linked list.**{CO2, L2}**

(Or)

B) Explain about insertion in atomic node linked list. **{CO2, L2}**

11A) Develop a C program for stack's using arrays. **{CO3, L3}**

(Or)

 B)   Develop a C program for circular queues. **{CO3, L3}**

12 A) Explain about binary tree traversals with an example. **{CO4, L2}**

(Or)

B) Demonstrate with an example deleting a node in a binary search tree. **{CO4, L2}**

13 A) Illustrate Merge sort with an example and write code for it. **{CO5, L2}**

(Or)

B) Illustrate Depth First search with an example. **{CO5, L2}**

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Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada-10
(An Autonomous College under the jurisdiction of Krishna University)
Reaccredited at the level 'A⁺' by the NAAC
College with Potential for Excellence
(Awarded by UGC)
DEPARTMENT OF ENGLISH
Course Structure and Syllabi under CBCS

Sl No.	Semester	Course Code	Name Of The Subject	Teaching Hours	Credits
1	**II Semester**	**ENGT21A**	**English-II**	**4**	**3**

GENERAL ENGLISH SYLLABUS FOR B.A/ B.COM/B.SC COURSES UNDER CBCS

OBJECTIVE: The main objective of this course is to facilitate the learners to acquire the linguistic competence essentially required in a variety of life situations and develop their intellectual, personal and professional abilities.

COURSE OUTCOMES:
At the end of the course, the learners will be able to:
CO 1.Analyze, interpret, appreciate and comprehend the specified text and the contexts in terms of their content, purpose and form. **PO1**

CO 2. Write effectively for a variety of professional and social settings adapting other writers' ideas as they explore and develop their own. **PO3**

CO 3. Speak clearly, effectively and appropriately in a public forum with correct pronunciation, pause and articulation of voice for a variety of audiences and purposes. **PO2**
CO 4.Think critically; convey their own interpretations, perspectives, producing new creative and artistic works following grammatical structures in oral and written assignments. **PO7**
CO 5.Acquaint the learner with some widely used words which appear to be similar but are semantically different and also help them to realize the importance of meanings, and understand the grammatical structures in writing.**PO7**

CO-PO MATRIX- ENG T21A						
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M						
CO2			M				
CO3		H					
CO4							H
CO5							H

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE
DEPARTMENT OF ENGLISH
ENGT21A   ENGLISH-II

Semester-II   **Max. Marks: 100**
No. of Hours per Week: 4   **External: 75M**
 No. of Credits: 3   **Internal: 25M**

SEMESTER-II

UNIT-I PROSE   **12 hours**

1. J.B.S. Haldane: The Scientific Point of View
2. A.G. Gardiner: On Shaking Hands

UNIT-II POETRY   **10 hours**

1. John Keats: Ode To Autumn
2. Kishwar Naheed: I Am Not That Woman (from An Anthology of Commonwealth Poetry edited by C.D.Narasimhaiah)

UNIT –III SHORT STORY   **12 hours**

1. Ruskin Bond: The Boy Who Broke The Bank
2. R.K.Narayan: Half A Rupee Worth

UNIT-IV   **10 hours**

ONE ACT PLAY- Anton Chekhov-A Marriage Proposal

UNIT -V LANGUAGE ACTIVITY   **16 hours**

  i.   Transformation of Sentences(Voice, Speech and Degrees)
 ii.   Dialogue Practice (Oral and Writing)
iii.   Guided composition
 iv.   Dialogue Writing
  v.   Reading Comprehension

SEMESTER–II   Credits – 3

TITLE OF THE PAPER: HINDI–II   COURSE CODE:HINT21

HINDI -II   **2020-2021**

COURSE NAME	COURSE OUTCOMES	COURSE OUTCOMES	PO'S
HINT21	CO1	भारतीय संस्कृति ,भारत सभ्यता ,भारतीय इतिहास व नारी का समाज में महत्व, पर्यावरण की आवश्यकता	PO4
	CO2	समाज में व्याप्त कुरीतियों से विद्यार्थियों का परिचय	PO4
	CO3	पत्र लेखन में पारिवारिक एवं व्यापारिक पत्रों की जानकारी	PO6
	CO4	भाषा परिज्ञान की वृद्धि	PO1
	CO5	तकनीकि शब्दावली से सरकारी कार्यालयों में प्रयुक्त शब्दों की जानकारी	PO7

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				M			
CO2				L			
CO3						L	
C04	H						
CO5							M

I. **गद्य संदेश :**

    1. संस्कृति और साहित्य का परस्पर संबंध   – डाँ. जी. सुन्दर रेड्डी

    2. आम फिर बौरा गये   – आचार्य हजारी प्रसाद द्विवेदी

    3. भारत एक है   – रामधारी सिंह दिनकर

II. **कथा लोक :**

    1. जरिया   – चित्रा मुद्गल

    2. भूख हडताल   – श्री बालशौरि रेड्डी

    3. परमात्मा का कुत्ता – मोहन राकेश

III. **व्याकरण :**

    1. कारक

    2. संधि व्किछेद

    3. वर्तनी दोष

IV. **कार्यालय हिन्दी**

    1. अंग्रेजी से हिन्दी

    2. हिन्दी से अंग्रेजी

V. **पत्र लेखन :**

    1. पुस्तकों का आर्डर देते हुए पत्र

    2. छुट्टी माँगने के पत्र

    3. भाई के नाम पर – हिन्दी सीखने की आवश्यकता पत्र

    4. नौकरी केलिए आवेदन पत्र

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-520 010.

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SEMESTER–II   Credits – 3

TITLE OF THE PAPER: HINDI–II   COURSE CODE:HINT2I

No. of Pages: 2   Roll No.:   Max. Marks: 75M
Time: 3 Hrs.   No. of Questions: 08   Pass Min.   : 30M

ജ്ഞ

1. *निम्न लिखित प्रसंगों में से किन्ही दो की सप्रसंग व्याख्या कीजिए :–* 2 X 8 = 16M**L3**

   अ. मानव कल्याण केलिए पुरुषार्थ पर जितना जोर यहाँ के साहित्य में दिया गया था –

       उतना अन्य किसी साहित्य में हमें दृष्टिगोचर नहीं होता ।

   आ. उन दिनों भारतीय लोगों का हृदय अधिक संवेदनशील था । आज हमारा संवेदन थोथा हो

        गया है । पुरानी बातों पढ़ने से ऐसा मालूम होता है जैसे कोई अद्यभूला पुराना सपना है ।

   इ. कहते हैं पहले पहल अगस्त्य ऋषि ने विंध्याचल को पार करके दक्षिण के लोगों को अपना संदेश

        सुनाया था ।

2. *किसी एक गद्यांश का विवेचन कीजिए ।*   14M**L1**

   अ. भारत एक है   आ. संस्कृति और साहित्य का परस्पर संबंध

3. *किसी एक कहानी का सारांश लिखकर उसकी विशेषताएँ बताइएः–*   10M**L1**

   अ. जरिया   आ. परमात्मा का कुत्ता

4. *किन्हीं पाँच कारक जोड कीजिएः-* 5 X 1 = 5M L3

   1. राम —— पत्र लिखा ।

   2. रमेश कलम —— लिखता है ।

   3. मेज —— किताब है ।

   4. राम —— पत्नी सीता है ।

   5. कृष्ण ने कंस —— मारा ।

   6. ये रमेश —— बच्चे हैं ।

   7. यह सुनील —— घर है ।

   8. जंगल — पशु-पक्षी रहते हैं ।

5. *किन्हीं पाँच शब्दों का संधि-विच्छेद कीजिए :-* 5 X 1 = 5M L3

   1. विद्यालय   2. पित्राज्ञा   3. नयन   4. एकैक

   5. स्वागत   6. इत्यादि   7. तपोवन   8. सदैव

6. *किन्ही पाँच शब्दों का वर्तनी दोष लिखिए :-* 5 X 1 = 5M L3

   1. पाठशला   2. कविइत्री   3. बोजन   4. लढ़का

   5. बाषा   6. अधयापक   7. छात्र   8. हीन्दी

7. *अ) निम्न लिखित में से किन्हीं पाँच अंग्रेजी शब्दों को हिन्दी में*

   रूपांतर कीजिएः- 5 X 1 = 5M L1

   1. Agriculture   2. Botany

   3. Code   4. Dairy

   5. Training   6. System

   7. Normal   8. Gland

आ) निम्न लिखित में से किन्हीं पाँच हिन्दी शब्दों को अंग्रेजी में

रूपांतर कीजिएः-   5 X 1 = 5M**L1**

1. मनो विज्ञान   2. रक्त वर्ग

3. कवच   4. विषम

5. प्राणि विज्ञान   6. तापमान

7. रसायन   8. ऊष्मा

8. किसी एक पत्र लिखिए :-   10M**L3**

1. चार दिन की छुट्टी माँगते हुए अपने प्रधानाचार्य के नाम एक पत्र लिखिए ।

2. हिन्दी सीखने की आवश्यकता पर अपने भाई के नाम पर पत्र लिखिए ।

PARVATHANENIBRAHMAYYASIDDHARTHACOLLEGE OF ARTS & SCIENCE
VIJAYAWADA - 520 010
An AutonomousCollege in the jurisdiction of KrishnaUniversity, Machilipatnam , A.P., India

STATISTICS	STAP21	2017-18	B.A. (EMS) & B.Sc. (MSCS)

(Practical at end of Second Semester)

SEMESTER - II
PRACTICAL - II

No. of credits : 1

Title of the course :

Course Outcome	Course: STAP21	P.O Mapping
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO 1	Find out the expected frequency for the Binomial and Poisson distribution.	PO6
CO 2	Find out the Expected frequencies for the Negative Binomial, Geometric and Hyper Geometric distributions.	PO5
CO3	Fitting of Normal distribution by using Areas and Ordinates methods.	PO5
CO 4	Acumen to applying the continuous distributions like Exponential distribution.	PO5
CO 5	Acumen to Applying the continuous distribution like Cauchy distribution.	PO5

COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO-PO MATRIX							
STAP21	CO1						M	
	CO2					H		
	CO3					H		
	CO4					H		
	CO5					H		

1.   Fitting of Binomial distribution – Direct method.
2.   Fitting of Binomial distribution – Direct method using MS Excel.
3.   Fitting of binomial distribution – Recurrence relation Method.
4.   Fitting of Poisson distribution – Direct method.
5.   Fitting of Poisson Distribution – Direct method using MS Excel.
6.   Fitting of Poisson distribution - Recurrence relation Method.
7.   Fitting of Negative Binomial distribution.
8.   Fitting of Geometric distribution.
9.   Fitting of Normal distribution – Areas method.
10. Fitting of Normal distribution – Ordinates method.
11. Fitting of Exponential distribution.
12. Fitting of Exponential distribution using MS Excel.
13. Fitting of a Cauchy distribution.
14. Fitting of a Cauchy distribution using MS Excel.

List of Reference Books:
1.   B.A/B.Sc. First Year Statistics(2010) , Telugu Akademi, Hyderabad.
2.   Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris
     P.Tsokos Academic Press(Elsevier), Haryana .
3.   Fundamental of Statistics, 2014, S.C.Gupta, Himalaya Publishing House

Structure of the Practical Examination

SemestersII Externalexamination for 50 Marks
(i)   For Continuous evaluation – 10 Marks
(ii)   For examination – 40 Marks

PARVATHANENIBRAHMAYYASIDDHARTHACOLLEGE OF ARTS & SCIENCE
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STATISTICS	STAT21	2017-18	B.A/B.Sc. (MSCs)

SEMESTER - II   **PAPER – II**   No. of credits : 4
PROBABILITY DISTRIBUTIONS

Objectives: The main objective of this course is to introduce probability distributions. By the end of the course students are expected to be able
(i) to apply standard discrete probability distribution to different situations.
(ii) to apply standard continuous probability distribution to different situations.

Title of the course :		
Course Outcome	**Course: STAT21** Upon successful completion of this course, students should have the knowledge and skills to:	**P.O Mapping**
CO 1	Applying the concept of Discrete distributions like Bernoulli, Binomial and Poisson.	PO5
CO 2	Applying the concepts of Discrete distributions like Negative Binomial, Geometric and Hyper Geometric distributions.	PO5
CO3	Applying the concepts of continuous distributions like Normal and Lognormal.	PO7
CO 4	Applying the concepts of continuous distributions like Exponential, Standard Laplace and Cauchy distributions.	`PO5
CO 5	Applying the concepts of continuous distributions like Gamma, Beta first kind and Second kind distributions.	PO5

COURSE CODE	CO-PO MATRIX							
	CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
STAT21	**CO1**					**M**		
	CO2					**M**		
	CO3							**M**
	CO4					**H**		
	CO5					**H**		

Unit I Discrete Distributions-I   (12H)
1.1   Uniform- Probability mass function,
    1.1.1   Mean and Variance,
    1.1.2   Moment generating function,
1.2   Bernoulli distribution- Probability mass function,
    1.2.1   Moments- Mean and Variance,
    1.2.2   Moment generating function,
    1.2.3   Cumulant generating function,
    1.2.4   Probability generating function.
1.3   Binomial distribution- Probability mass function,
    1.3.1   Moments- non-central and Central,
    1.3.2   Moment generating function,
    1.3.3   Cumulant generating function,
    1.3.4   Probability generating function,
    1.3.5   Characteristic function,
    1.3.6   Recurrence relation for the central moments,
    1.3.7   Mode,
    1.3.8   Mean Deviation about mean,
    1.3.9   Additive property,
    1.3.10   Recurrence relation for the probabilities,
1.4   Poisson distribution- Probability mass function,
    1.4.1   Moments- Non-central and Central,
    1.4.2   Moment generating function,
    1.4.3   Cumulant generating function,
    1.4.4   Probability generating function,
    1.4.5   Characteristic function,
    1.4.6   Recurrence relation for the central moments,
    1.4.7   Mode ,
    1.4.8   Limiting Case- Binomial to Poisson,
    1.4.9   Additive or Reproductive property,
    1.4.10   Recurrence relation for the probabilities,
1.5   Their real life applications.
Unit II: Discrete Distributions II (12H)
2.1   Negative Binomial distribution- Probability mass function,
    2.1.1   Moment generating function,
    2.1.2   Cumulants,
    2.1.3   Probability generating function,
    2.1.4   Poisson Distribution as a Limiting case of the Negative Binomial,
    2.1.5   Recurrence relation for the central moments,
    2.1.6   Recurrence relation for the probabilities,
    2.1.7   Reproductive property.

STATISTICS	STAT21	2017-18	B.A/B.Sc. (MSCs)

2.2   Geometric distributions- Probability mass function,
    2.2.1   Moments- Mean and Variance,
    2.2.2   Moment generating function,
    2.2.3   Memory less property,

2.2.4   Recurrence relation for the central moments,
2.2.5   Recurrence relation for the probabilities,
2.2.6   Reproductive property.
2.3   Hyper -Geometric distribution - Probability mass function,
2.3.1   Mean and variance,
2.3.2   Binomial approximation to Hyper-Geometric distribution,
2.4   Their real life applications.

Unit III: Continuous Distributions-1(12H)
3.1   Rectangular or Uniform Distribution- Probability density function,
3.1.1   Moments-Mean and Variance,
3.1.2   Moment generating function,
3.1.3   Characteristic function,
3.1.4   Mean Deviation about mean,
3.2   Normal distribution- Probability density function,
3.2.1   Normal distribution as a limiting form of binomial distribution,
3.2.2   Normal distribution as a limiting form of Poisson distribution,
3.2.3   Chief Characteristics of the Normal distribution,
3.2.4   Mode,
3.2.5   Median,
3.2.6   Moment generating function,
3.2.7   Cumulant generating function,
3.2.8   Characteristic function,
3.2.9   Moments of Normal distribution,
3.2.10   Additive or reproductive productive property,
3.2.11   Mean deviation about mean,
3.2.12   Area property,
3.2.13   Importance of Normal distribution,
3.3   Log- normal distribution- Probability density function,
3.3.1   Mean ,
3.3.2   Variance
3.3.3   Properties
3.4   Their real life applications.

Unit IV: Continuous Distributions II (12H)
4.1   Exponential distribution - Probability density function,
4.1.1   Moments- non-central and central,
4.1.2   Moment generating function,
4.1.3   Lacks memory property,
4.1.4   Additive or reproductive productive property,
4.2   Standard Laplace(Double Exponential) distribution,
4.2.1   Characteristic function,
4.2.2   Moments of Standard Laplace(Double Exponential) distribution,
4.2.3   Two parameter Laplace distribution.
4.3   Cauchy distribution (one and two parameters)-Probability density function,
4.6.1   Characteristic function,
4.6.2   Moments of Cauchy distribution(mean only),
4.6.3   Additive probability.

STATISTICS	STAT21	2017-18	B.A B.Sc. (MSCs)

4.4 Their real life applications.

Unit V: Continuous Distributions II (12H)

5.1 Gamma Distribution(one and two parameters)-Probability density function,
     5.1.1   Moment generating function,
     5.1.2   Cumulant generating function,
     5.1.3   Moments of gamma distribution,
     5.1.4   Limiting form of gamma distribution,
     5.1.5   Additive property.
5.2 Beta distribution of first kind- Probability density function,
     5.2.1   Mean and variance,
     5.2.2   Harmonic mean.
5.3 Beta distribution of Second kind - Probability density function,
     5.3.1   Mean and variance,
     5.3.2   Harmonic mean.
5.4 Their real life applications.

Text Book:

Fundamentals of Mathematical Statistics, 11 th Edition, 2007, S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi.

Unit I: Chapter 8 Section :   8.2, 8.2.1, 8.3, 8.3.1, 8.4, 8.4.1 - 8.4.2, 8.4.4 - 8.4.12, 8.5, 8.5.1-10
Unit II: Chapter 8 Section :   8.6, 8.6.1- 8.6.5, 8.7, 8.7.1 - 8.7.3, 8.8, 8.8.1, 8.8.3.
Unit III: Chapter 9 Section : 9.1, 9.2, 9.2.1- 9.2.15 , 9.3,9.3.1- 9.3.4,
Unit IV: Chapter 9 Section : 9.8, 9.8.1, 9.9, 9.9.1 - 9.9.4, 9.12, 9.12.1-9.12.2
Unit V: Chapter 9 Section: 9.5, 9.5.1 - 9.5.3, 9.6, 9.6.1, 9.7, 9.7.1

List of Reference Books:
1.B.A/B.Sc. First Year Statistics(2010) , Telugu Akademi, Hyderabad.
2. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
3. Probability and Statistics,Volume I, D.Biswas, New central book Agency (P) Ltd, New Delhi.
4. An outline of Statistical theory, Volume two,3rd Edition,2010(with corrections) A.M.Goon, M.K. Gupta, B.Dasgupta ,The World Press Pvt.Ltd., Kolakota.
5. Sanjay Arora and BansiLal:. New Mathematical Statistics, SatyaPrakashan ,New Delhi.
6. Mathematical Statistics, 3rd Edition, 2009, ParimalMukhopadhyay, Books & Allied (p) Ltd, Kolkata.

Model Paper Structure
Section A: Eight questions are to be set, of these five questions are to be answered.(5 x 5 = 25 M)
Section B: Two questions from each unit with internal choice.   (5 X 10M = 50M)

SECTION - A   Max.Time :3h

Answer any FIVE of the following the following: **5 x 5 = 25M**
1.   What are the applications of Poisson distribution?
2.   Define binomial distribution and find its probability generating function.
3.   Define rectangular distribution and find its mean and variance.
4.   Obtain mean and variance of gamma distribution.
5.   What is the importance of Normal distribution.
6.   Obtain characteristic function of Cauchy distribution.
7.   Define Laplace distribution and wrtie any two applications.
8.   Define negative binomial distribution and write atleast two properties of negative binomial distribution

SECTION – B

Answer the following Questions   **5 x 10 = 50M**
9.   (a)Obtain the recurrence relation for the moments of binomial distribution.

OR

(b)Derive the Poisson distribution as a limiting form of a binomial distribution.

10.   (a) Define Hypergeometric distribution and Obtain mean and variance of hypergeometric distribution.

OR

(b) Let X_1, X_2 be independent r.v.'s each having geometric distribution q^k p; k= 0,1,2,....... show that the conditional distribution of X_1 given $X_1 + X_2$ is uniform.

11.   (a) Prove that $\mu_{2n+1} = 0$ and $\mu_{2n} = 1.3.5....(2n-1)\sigma^{2n}$

OR

(b) In a distribution exactly normal, 10.03% of the items are under 25 Kilogram weight   and 89.97% of the items are under 70 kilogram weight. What are the mean and standard deviation of the distribution.

12.   (a) Obtain M.G.F. of exponential distribution find its mean and variance.

OR

(b) Obtain the characteristic function of standard Laplace distribution and hence find its mean and variance.

13.   (a) Obtain mean, variance and harmonic mean of beta distribution of first kind.

OR

(b) Show that Gamma distribution tends to normal distribution for large values of parameter λ.

***

Course Code : TEL T21

COURSE NAME	COURSE OUT COMES NO	COURSE OUT COMES	PO NO.
B.A, BBA, BBA (BA) B.COM (GEN), B.COM (CA) B.SC (MPCS), B.SC(BZC), B.SC(MECS) B.SC(MSCA)	CO 1	గతంలో జరిగిన గుణదోషాలు గ్రహించి సజ్జన మైత్రి బంధాన్ని అలవర్చుకొని ప్రవర్తించగలరు	5
	CO 2	నూతన పోకడలను అర్థంచేసుకొని ఇంకా ఎదుగుదలకు తోడ్పడండి మనుషులంతా ఒకటే అనే సదుద్దేశంతో ముందుకు సాగ గలదు	4
	CO 3	తేలికైన మాటల రూపంలో గ్రహించిన విషయాలని తనతోజీవిస్తున్న సమాజానికి ఉపయోగించి ఉత్తమ పౌరులుగా ప్రవర్తనకు దారితీస్తుంది	3
	CO 4	వృత్తులు మనిషిఅభ్యున్నతికి మాత్రమేనని గ్రహించి వాని ద్వారా భవిష్యత్ తరాలు సక్రమ పద్ధతిలో ప్రయాణించటానికి అవకాశం కల్పించేది	7
	CO 5	నేర్చిన విషయజ్ఞానం మన మస్తిష్కంలోఎంతవరకు నిక్షిప్తమై ఉందనే విషయాలు గుర్తు చేసేందుకు ఉపయోగకరం	6

CO PO MATRIX

Course Code : TEL T21

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2				M			
CO3			M				
CO4							H
CO5						H	

Telugu	TELT21	2019-20	B.A,B.Sc,,B.Com,B.Com Computers, Appilications, B.Com E-commerce,BBA,BBABA,B.Com TPP,BCA

Semester -II   SYLLABUS   Credits: 3

అభ్యసన ఫలితాలు :

CO 1 : గతంలో జరిగిన గుణదోషాలు గ్రహించి సజ్జన మైత్రి బంధాన్ని అలవర్చుకొని
         ప్రవర్తించగలరు

CO 2 : నూతన పోకడలను అర్థం చేసుకొని ఇంకా ఎదుగుదలకు తోడ్పడండి మనుషులంతా
          ఒకటే అనే సదుద్దేశంతో ముందుకు సాగ గలదు

 CO 3 : తేలికైన మాటల రూపంలో గ్రహించిన విషయాలని తనతో జీవిస్తున్న సమాజానికి
           ఉపయోగించి   ఉత్తమ పౌరులుగా ప్రవర్తనకు దారితీస్తుంది

CO 4 : వృత్తులు మనిషి అభ్యున్నతికి మాత్రమేనని గ్రహించి వాని ద్వారా భవిష్యత్ తరాలు
          సక్రమ పద్ధతిలో ప్రయాణించటానికి అవకాశం కల్పించేది

 CO 5 : నేర్చిన విషయ జ్ఞానం మన మస్తిష్కంలో ఎంతవరకు నిక్షిప్తమై ఉందనే
          విషయాలు గుర్తు చేసేందుకు ఉపయోగకరం

ప్రాచీన కవిత్వం

1.మను చరిత్ర   - అలసాని పెద్దన

   (మను చరిత్ర ద్వితీయాస్వాసం 31 వ పద్యం నుండి 68వ పద్యం)

2.సుభద్ర పరిణయం   - చేమకూర వెంకట కవి

(విజయ విజయ విలాసం తృతీయాస్వాసం 93వ పద్యం నుండి 139 వ పద్యం)

ఆధునిక కవిత్వం

 1.ముసాఫర్లు   - జాషువా

 2.మేఘ దూతం   - పుట్టపర్తి నారాయణాచార్యులు

కథానికలు

 1.కులవృత్తి   - కొలకలూరి ఇనాక్

 2. మార్పు వెనుక మనిషి   -శీలా సుభద్రాదేవి

ఉపవాచకం (నవల)

బతుకాట   - డాక్టర్ .వి. ఆర్ .రాసాని

Parvathaneni Brahmayya Siddhartha College of Arts and Science Vijayawada 520010
An autonomous college in the Jurisdiction of Krishna University. Machilipatnam)

Telugu	TELT21	2019-20	B.A,B.Sc,,B.Com,B.Com Computers, Appilications, B.Com E-commerce,BBA,BBABA,B.Com TPP,BCA

Semester -II   MODEL PAPER   Credits: 3

1. మన చరిత్ర పాఠ్యం ఆధారంగా ప్రవరుని గుణగణాలను వివరించండి (లేదా) 15M

   సుభద్ర పరిణయం లోని తెలుగు వాళ్ళ సంస్కృతి సంప్రదాయాలను వివరించండి

2. జాషువా కవి ముస్తఫాలు పాఠ్యాంశం ద్వారా అందించిన సందేశాన్ని తెలపండి (లేదా) 15M

   మేఘదూతము పాఠ్యాంశంలో పుట్టపర్తి వారు వర్ణించిన ఆంధ్రుల వైభవాన్ని తెలపండి

3. క్రింది వానిలో రెండింటికి సందర్భ సైత వ్యాఖ్యలు రాయండి   2X5 =10M

   1. పారవైచితే మిన్నులు పడ్డచోట

   2. మొదమున నేగి కళ్యాణ వేదికడకు

   3.పారకున్న నీరు నీరు పాచి పట్టు

   4.శాస్త్రపుల రక్తం తెడవి సెలయేరుగా

4. కులవృత్తి కథ ద్వారా దళితుల జీవనాన్ని వివరించండి   (లేదా)   10M

   మార్పు వెనుక మనిషి కథలో రచయిత్రి తెలిపిన సందేశాన్ని తెలపండి

5.ఈ క్రింది వానిలో మూడింటికి సమాధానం రాయండి   3X5 =15M

   1.వరూధిని ప్రవరాఖ్యుల సంభాషణను గురించి రాయండి

    2. .ముసాఫర్లు పాఠ్య భాగంలో మానవత్వ ప్రబోధం

    3. కులవృత్తి కథలోని సందేశాన్ని సందేశమును తెలపండి

    4. మార్పు వెనుక మనిషి కథలో విచిత్రమైన పల్లె జీవనమును తెలపండి

    5. బతుకాట నవల లోని గజ్జ పూజను వర్ణించండి

    6.బతుకాట నవల లోనిసిద్దోజి పాత్ర చిత్రణ

6. బతుకాట నవల లోని కళాకారుల జీవనాన్ని చిత్రించింది   (లేదా)   15M

   బతుకాట నవల ద్వారా రాసాని వారు చెప్పదలచిన ముఖ్యాంశాలను రాయండి

COMPUTER SCIENCE	CSCP13A	2016-2017	B.C.A, B.Sc. (CSCS)

SEMESTER – I   **Credits: 2**

PROGRAMMING USING C LAB

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	1. Design an algorithmic solution for a given problem.	PO 1
CO2	2. Write a maintainable C program for a given algorithm.	PO 1
CO3	3. Write well documented and indented program according to coding standards..	PO 1
CO4	4. Debug a given program.	PO 1
CO5	5. Execute the C program	PO 7

1. Write a C program to calculate the expression: ((a*b)/c)+(a+b-c)
2. Write a C program to calculate $(a+b+c)^3$.
3. Program to convert temperature from
      a. Celsius to Fahrenheit.
      b. Fahrenheit to Celsius.
4. Write a C program to calculate the Compound Interest.
5. Program to convert Hours into seconds.
6. Write a C program to Find Biggest of Three numbers.
7. Write a C program to read student marks in five subjects and calculate the Total, Average and Grade according to the following conditions:
      i. If average >=75 grade is ‗A‘.
      ii. If average >=60 and <75 grade is ‗B‘.
      iii. If average >=50 and <60 grade is ‗C‘.
      iv. Otherwise grade is ‗D‘.
      v. Check that marks in each subject >= 35.

8. Write a C program to find biggest of two numbers using Switch – Case.
9. Program to display number of days in given month using Switch – -Case.
10. Write a C program to check whether the given number is Prime or Not.
11. Write a program to
      i. Check whether given number is Palindrome or Not.

ii. Find the Reverse of a given number.

12. Program to check whether a given number is
    i. Strong or Not.
    ii. Armstrong or Not.
    iii. Perfect or Not.

13. Write a C program to print Fibonacci Series.
14. Write a C Program to print Prime Numbers up to given range.
15. Write a program to print multiplication tables up to given range.
16. Write a C program to perform
    i. Matrix Multiplication.
17. Program to display Student Details using Structures.
18. Program to swap two numbers using different parameter passing techniques.
19. Write a C program to
    i. Write data into a File.
    ii. Read data from a File.

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS AND SCIENCES VIJAYAWADA - 10.

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COMPUTER SCIENCE	CSCT11A	2017-18	B.C.A, B.Sc. (CSCS)

SEMESTER – I   **PAPER – 1**

Credits – 4

PROGRAMMING IN "C"   **Total : 60 Hrs**

Course Objectives:

1. Learn how to solve common types of computing problems.

2. Learn data types and control structures of C

3. Learn to map problems to programming features of C.

4. Learn to write good portable C programs.

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO$_2$	2. Understand the C tokens and control structures.	PO1
CO$_3$	3. Understand to handle arrays and strings	PO1
CO$_4$	4. Use the 'C' language constructs in the right way using pointers, structures and unions	PO1
CO$_5$	5. Design, develop and test programs written in 'C' files.	PO1,PO7

UNIT - I: Introduction to Algorithms and Programming Languages   12 Hrs

1.1   **Introduction to Algorithms and Programming Languages**

1.1.1   Algorithm - Key features of Algorithms - examples of Algorithms

1.1.2   Flow Charts– Pseudo code

1.1.3   Programming Languages – Generation of Programming Languages – Structured Programming Language.

1.2   Introduction to C

1.2.1   Introduction – Structure of C Program

1.2.2   Writing the first C Program

1.2.3   File used in C Program – Compiling and Executing C Programs

1.2.4   Using Comments – Keywords – Identifiers

1.2.5   Basic Data Types in C

1.2.6   Variables – Constants

1.2.7   I/O Statements in C

1.2.8   Operators in C

1.2.9   Programming Examples

1.2.10   Type Conversion and Type Casting.

UNIT - II: CONTROL STRUCTURES AND FUNCTIONS   16 Hrs

2.1   Decision Control and Looping Statements

2.1.1   Introduction to Decision Control Statements

2.1.2   Conditional Branching Statements

2.1.3   Iterative Statements

2.1.4   Nested Loops

2.1.5   Break and Continue Statement – Goto Statement.

2.2   Functions

2.2.1   Introduction

2.2.2   using functions – Function declaration/ prototype – Function definition

2.2.3   function call – return statement – Passing parameters

2.2.4   Scope of variables

2.2.5   Storage Classes

2.2.6   Recursive functions

UNIT - III: Arrays and Strings   **16 Hrs**

3.1   Arrays

3.1.1   Introduction

3.1.2   Declaration of Arrays

3.1.3   Accessing elements of the Array – Storing Values in Array

3.1.4   Calculating the length of the Array

3.1.5   Operations that can be performed on Array

3.1.6   One dimensional array

3.1.6.1 Accessing one dimensional array

3.1.6.2 Passing one dimensional array to function

3.1.7   Two dimensional Arrays

3.1.7.1 Accessing two dimensional arrays

3.1.7.2 passing two dimensional arrays to functions

3.2   **Strings**

3.2.1   Introduction

3.2.2   String Operations – without using functions

3.2.3   String and Character functions.

3.2.4   String Operations using String functions.

UNIT - IV: Pointers, Structures and Unions   **12 Hrs**

1.1   Pointers
1.1.1   Understanding Computer Memory – Introduction to Pointers
1.1.2   declaring Pointer Variable
1.1.3   Pointer Expressions and Pointer Arithmetic – Null Pointers
1.1.4   Passing Arguments to Functions using Pointer
1.1.5   Pointer and Arrays – Passing Array to Function

1.1.6 Memory Allocation in C Programs

1.1.7 Memory Usage – Dynamic Memory Allocation

1.1.8 Drawbacks of Pointers

1.2 **Structures**

1.2.1 Introduction to structures

1.2.2 Nested Structures

1.2.3 Arrays of Structures

1.2.4 Self referential Structures

1.3 **Union, and Enumerated Data Types:**

1.3.1 Introduction to Union – accessing union elements

1.3.2 Enumerated Data Types.

UNIT – V: File Handling   **4 Hrs**

5.1 **Files**

5.1.1 Introduction to Files

5.1.2 Using Files in C

5.1.3 Reading Data from Files

5.1.4 Writing Data from Files

5.1.5 Detecting the End-of-file

5.1.6 Error Handling during File Operations.

TEXT BOOKS:

1. Computer Fundamentals and Programming in C by REEMA THAREJA from OXFORD UNIVERSITY PRESS

REFERENCE BOOKS:
1. E Balagurusamy: ―COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
3. Henry Mullish & Huubert L.Cooper: The Sprit of C, Jaico Pub. House,1996.
4. Teach your C Skills-Kanithker

Student Activity:

1. Create time table using faculty workload, subjects etc.
2. Prepare a complete note on recursion and its types
3. Prepare complete note on types of files and file formats for different input data

Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
I	MATT11A	CORE	DIFFERENTIAL EQUATIONS	100	25	75	6	5

Programme Outcomes

S. No	P.O
	At the end of the Programme the student will be able to:
PO5	**Critical Thinking:**Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degrees to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual ,organizational and personal) from different perspectives
PO6	**Specified skills/ transferable skills:**Demonstrate subject-related and transferable skills that are relevant to some of the job trades and employment opportunities.
PO7	**Self-directed and Life –long learning**: Acquire the ability to engage in independent and life long learning in the broadest context socio-technological changes.

Course Outcomes of MATT11A

S. No	C.O	
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO1	Determine the solution of differential equations of the first order and of the first degree by Exact, Linear and Bernoulli's method.	
CO2	Understand the basic concepts of first order differential equations to find Orthogonal trajectories.	
CO3	Determine the solution of differential equations of the first order and of a degree higher than first by using methods of solvable for P, X, and Y.	
CO4	Compute all solutions of second and higher order linear differential equations with constant coefficients, linear	
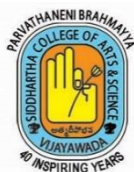
	equations with variable coefficients.	
CO5	Calculate the solutions of higher order differential equations by Cauchy Euler and Variation of parameters.	

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1					H		
CO2					H		
CO3						M	
CO4							M
CO5							M

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE

VIJAYAWADA-10.

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

MATHEMATICS	MAT T11A	2020 – 21 onwards	B.A,B.Sc(MPC,MPCS,MECS,CAMS, MSCS,CAME,MSDS)

DIFFERENTIAL EQUATIONS

SEMESTER-I   **No of Credits: 5**

OBJECTIVES:

1.Understand all of the concepts relating to the order and linearity of ODEs, analytic and computational solution methods for ODEs, and the real-world applications of ODEs.

2. Apply your understanding of the concepts, formulas, and problem-solving procedures to thoroughly investigate relevant physical models.

3. Explain the concepts of linear systems, ODE solution methods, and related ideas at a fundamental level, as well as how and why we use the solution techniques that we use.

UNIT-I: DIFFERENTIAL EQUATIONS OF FIRST ORDER& FIRST DEGREE

(12Hrs)

1.1   Linear Differential Equations

1.2   Differential Equations Reducible to Linear Form, Bernoulli's differential equations.

1.3   Exact Differential Equations

1.4   Integrating Factors, 1/Mx+Ny, 1/Mx-Ny, $e^{\int f(x)}dx$, $e^{\int g(y)}dy$, and Inspection method

1.5   Change of Variables

UNIT-II: ORTHOGONAL TRAJECTORIES &DIFFERENTIAL EQUATIONS OF FIRST ORDER BUT NOT FIRST DEGREE

(12Hrs)

2.1   Orthogonal Trajectories

2.2   Self Orthogonal Trajectories

2.3   Equations solvable for p

2.4   Equations solvable for y

2.5   Equations solvable for x

2.6   Equations Homogeneous in X & Y

2.7   Equations that do not contain x (or y)

2.8   Clairaut's Equation and Equations reducible to clairaut's form.

UNIT – III: Higher order linear differential equations-I   (12Hrs)

3.1 Solution of homogeneous linear differential equations of order n with constant coefficients

3.2   Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

3.3   General Solution of f(D)y=0

3.4   General Solution of f(D)y=Q when Q is a function of x.

3.5 $\dfrac{1}{f(D)}$ is Expressed as partial fractions.

3.6   P.I. of f (D) y = Q when Q= be^{ax}

3.7   P.I. of f (D) y = Q when Q is b sinax or b cosax.

UNIT – IV: Higher order linear differential equations-II   (12Hrs)

4.1 Solution of the non-homogeneous linear differential equations with constant coefficients.

4.2 P.I. of f (D) y = Q when Q= bx^k

4.3 P.I. of f (D) y = Q when Q= $e^{ax}V$

4.4 P.I. of f (D) y = Q when Q= xV

4.5 P.I. of f (D) y = Q when Q= x^mV where v = sin bx and cosbx

UNIT-V: Higher order Differential Equations –III   (12Hrs)

5.1   The Cauchy-Euler Equation.

5.2   Linear differential Equations with non-constant coefficients

5.3   Method of Variation of parameters.

Prescribed Text book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	V.Krishna Murthy	A text book of mathematics for B.A/B.ScVol – I	S-Chand&co	2015

Reference books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF

				PUBLICATION
1	Dr.A. Anjaneyulu	A text book of mathematics for B.A/B.ScVol – I	Deepthi Publications	2015
2	RaiSinghania	Ordinary& Partial Differential Equations	S-Chand	2009
3	Zafar Ahsan	Differential Equations and their applications	Prentice-Hall of India Pvt Ltd, McGraw Hill	2000

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.
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CBCS/ SEMESTER SYSTEM(W.e.f 2020-21 Admitted Batch)
B.A./B.Sc. MATHEMATICS
COURSE-I, DIFFERENTIAL EQUATIONS

MATHEMATICS MODEL PAPER

Time: 3hrs.   Max. Marks: 75
Section – A
Answer any FIVE questions   **5x5=25**

1. Determine the solution of $2xy \, dy - (x^2+y^2+1) \, dx = 0$ (CO1,L2)
2. Determine the solution of $x\dfrac{dy}{dx} + 2y - x^2 \log x = 0$ (CO1,L2)
3. Find the orthogonal trajectories of the family of $r = a(1-\cos\theta)$ where a is a parameter.

(CO2, L2)
4. Solve $x = y + p^2$ (CO3,L2)
5. Compute the C.F of $(D^3 + 3D^2 + 3D + 1)y = e^{5x}$ (CO4,L3)
6. Compute the P.I of $(D^3 + 4D)y = \sin 2x$ (CO4,L3)
7. Determine the solution of $d^2 y/dx^2 + y = \text{Cosec } x$ by variation of parameters. (CO5,L2)
8. Determine the solution of $\dfrac{d^2 y}{dx^2} - \cot x \dfrac{dy}{dx} - (1 - \cot x)y = e^x \sin x$ (CO4, L3)

Section – B

Answer ALL questions.   **(5 x 10 = 50 marks)**

Unit – I

9. Determine the solution of x (1 + xy) dy + y (1 - xy) dx = 0   (CO1, L2)

(OR)

10. Determine the solution of $x\dfrac{dy}{dx} + y = y^2 \log x$ (CO1, L2)

Unit – II

11. Find the orthogonal trajectories of the family of curves $x^{2/3} + y^{2/3} = a^{2/3}$, where 'a' is the parameter.   (CO2, L2)

(OR)

12. Determine the solution of $y + px = p^2 x^4$ (CO3, L2)

Unit – III

13. Determine the solution of $(D^2 + 4D + 4)y = e^{4x}$ (CO4, L3)

(OR)

14. Determine the solution of $(D^2 - 2D + 3)y = \cos 2x$ (CO4, L3)

Unit – IV

15. Determine the solution of $\dfrac{d^2 y}{dx^2} - 6\dfrac{dy}{dx} + 13y = 8e^{3x} \sin 2x$ (CO4, L3)

(OR)

16. Determine the solution of $(D^4 + 2D^2 + 1)y = x^2 \cos x$ (CO4, L3)

Unit - V

17. Determine the solution of $\left[(x-1)D^2 - xD + 1\right]y = (x-1)^2$ by variation of parameters. (CO5, L2)

(OR)

18. Determine the solution of $(x^2 D^3 + 2x^3 D^2 - x^2 D^2 + x)y = 1$ (CO5, L2)

****

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada-10

(An Autonomous College under the jurisdiction of Krishna University)

Reaccredited at the level 'A' by the NAAC

College with Potential for Excellence

(Awarded by UGC)

Course Structure and Syllabi under CBCS

Sl No.	Semester	Course Code	Name Of The Subject	Teaching Hours	Credits
1	I Semester	ENGT11A	English-I	4	3

OBJECTIVE: The main objective of this course is to facilitate the learners to acquire the linguistic competence essentially required in a variety of life situations and develop their intellectual, personal and professional abilities.

COURSE OUTCOMES:

At the end of the course, the learners will be able to:

CO 1. Analyze, interpret, appreciate and comprehend the specified text and the contexts in terms of their content, purpose and form. *PO1*

CO 2. Write effectively for a variety of professional and social settings adapting other writers' ideas as they explore and develop their own. *PO3*

CO 3. Speak clearly, effectively and appropriately in a public forum with correct pronunciation, pause and articulation of voice for a variety of audiences and purposes. *PO2*

CO 4. Think critically; convey their own interpretations, perspectives, producing new creative and artistic works following grammatical structures in oral and written assignments. *PO7*

CO-PO MATRIX- ENG T11A						
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M						
CO2			M				
CO3		H					
CO4							H
CO5	---						

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF ENGLISH

GENERAL ENGLISH SYLLABUS FOR B.A/ B.COM/B.SC COURSES UNDER CBCS

UNIT-I PROSE

1. **A.P.J. Abdul Kalam: The Knowledge Society (from Ignited Minds)**
2. **Ngugi Wa Thiong'o: The Language of African Literature (from Decolonizing the Mind)**

UNIT-II POETRY

1. **Robert Frost: The Road Not Taken**
2. **Nissim Ezekiel: Night Of The Scorpion**

UNIT –III SHORT STORY

1. **Mulk Raj Anand: The Lost Child**
2. **Henry Lawson: The Loaded Dog**

UNIT-IV

ONE ACT PLAY- STEPMOTHER-ARNOLD BENNETT

UNIT -V LANGUAGE ACTIVITY

1. **Classroom and LABORATORY Activities**
   Sound (Pronunciation), Sight (Spelling), Sense (Meaning), Syntax (Usage)
2. **Classroom Activity**
     i. **Exercises in Articles and Prepositions**
    ii. **Exercises in Tenses, Interrogatives and Question Tags**

SEMESTER–I   Credits – 3

TITLE OF THE PAPER: HINDI–I   COURSE CODE:HINTII

HINDI-I   **2018-2019**

COURSE NAME	COURSE OUTCOMES	COURSE OUTCOMES	PO'S
HINT11	CO1	मानव मूल्यों को पहचानकर समाज कल्याण हेतु देने के लिए तैयार रहना।	PO3
	CO2	आधुनिक युग की भावनाओं को पहचानकर सामाजिक समस्याओं का सामना करते हुए , निरंतर आगे बढना।	PO2
	CO3	विषय का विश्लेषण करके,विषयों को अपना अनुकूल बनाकर समाज में आगे बढने के लिए प्रयास करना।	PO7
	CO4	ग्रहण किये गये पाठ्यांशों द्वारा विध्यार्थियों का ज्ञान मापन किया जाता सकता हैं।	PO1
	CO5	हमारी भाषा का उपयोग हम किस भाषा का प्रयोग करते हैं, उसके द्वारा समाज कल्याण, विद्यार्थियों का उज्वल भविष्य हेतु उपयोगी होना चाहिए।	PO7

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1			H				
CO2		M					
CO3							H
C04	L						
CO5							H

I. गद्य संदेश :

    1. साहित्य की महत्ता - महावीर प्रसाद द्विवेदी

    2. सच्ची वीरता- सरदार पूर्णसिंह

    3. मित्रता   - आचार्य रामचन्द्र शुक्ल

II. कथा-लोक :

    1. मुक्तिधन   - प्रेमचंद

    2. गूदड साई   - जयशंकर प्रसाद

    3. उसने कहा था   - चन्द्रधरशर्मा गुलेरी

III. व्याकरण :

    1. लिंग

    2. वचन

    3. विलोम शब्द

IV. कार्यालय हिन्दी

    1. अंग्रेजी से हिन्दी

    2. हिन्दी से अंग्रेजी

V. अवकरण

Reference Books:

गद्य संदेश

Hindi Text Book for B.A., B.Com., & B.Sc.
Published by
LORVEN PUBLICATIONS, 3-5-1108, Blood bank Road, Narayanaguda, Hyderabad.

SEMESTER–I   Credits – 3

TITLE OF THE PAPER: HINDI–I   COURSE CODE:HINT11

No. of Pages: 2	Roll No.:	Max. Marks: 75M
Time: 3 Hrs.	No. of Questions: 08	Pass Min. : 30M

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1. *निम्न लिखित प्रसंगों में से किन्ही दो की सप्रसंग व्याख्या कीजिए :-* <u>2 X 8 = 16M L3</u>

    अ. ज्ञान-राशि के संचित कोष ही का नाम साहित्य है ।

    आ. सत्व-गुण के समुद्र में जिन का अन्तः-
        करण निमग्न हो गया वे ही महात्मा, साधु और वीर है ।

    इ. कुसंग का ज्वर सबसे भयानक होता है ।

2. *किसी एक गद्यांश का सारांश लिखकर उसकी विशेषताएँ बताइए ।* <u>14M L1</u>

    अ. मित्रता   आ. सच्ची वीरता

3. *किसी एक कहानी का सारांश लिखकर उसकी विशेषताएँ बताइएः-* <u>10M L1</u>

    अ. गूढडसाई   आ. उसने कहा था

4. *किन्हीं पाँच वाक्यों को लिंग बदलकर वाक्य फिर से लिखिए :-* <u>5 X 1 = 5M L3</u>

    1. लडका बाजार जा रहा है ।
    2. अध्यापक पाठ पढ़ाते हैं ।
    3. पंडित पूजा करता है ।
    4. शेर जंगल में दौडता है ।

5. वह एक बडा गायक है ।

6. बच्ची रो रही है ।

7. पिताजी घर जा रहे हैं ।

8. नौकर बाजार से सामान लाता है ।

5. *किन्हीं पाँच वाक्यों को वचन बदलकर फिर से लिखिएः-*   <u>5 X 1 = 5M L3</u>

1. सभा में विद्वान बोल रहा है ।

2. लडकी मैदान में दौडती है ।

3. औरत घर में काम करती है ।

4. मैं खाना खाता हूँ ।

5. वह कहानी लिखता है ।

6. ये बाजार जा रहे हैं ।

7. गाय मैदान में चरती है ।

8. यहाँ एक नेता है ।

6. *किन्ही पाँच शब्दों के विलोम रूप लिखिए :-*   <u>5 X 1 = 5M L3</u>

1. अंधकार   2. लायक

3. अनुकूल   4. ज्ञान

5. सफल   6. उचित

7. बडा   8. नाम

7. *अ) किन्हीं पाँच अंग्रेजी शब्दों को हिन्दी में रूपांतर कीजिएः-* <u>5 X 1 = 5M L1</u>

1. Balance   2. Goods

3. Loss   4. Call letter

5. Advance   6. Cheque

7. Bill   8. Labour

आ) किन्ही पाँच हिन्दी शब्दों को अंग्रेजी में रूपांतर कीजिए :- **5 X 1 = 5M L1**

1. अनुदान   2. हिसाब

3. निधि   4. विभाग

5. पूंजी   6. दस्तावेज

7. श्रम   8. उद्योग

8. अवकरण कीजिए :-   **10M L3**

आदर्श विद्यार्थी लगन और तपस्या की आँच में पिघलकर स्वयं को सोना बनाता है । जो छात्र सुख-सुविधा और आराम के चक्कर में पड़े रहते हैं, वे अ पने जीवन की नींव को ही कमजोर बना लेते हैं । परिश्रमी विद्यार्थी को यदि सफलता न मिले, तो वह निराश नहीं होता है । बल्किवह बार-बार मेहनत करके सफलता प्राप्त करता है । वह सदा यह जानने की इच्छा रखता हैं व जानने केलिए सचेष्ट रहता है कि कार्य में सफलता क्यों नहं मिली । वह यह भी जानता है कि बिना परिश्रम के केवल इच्छा मात्र से ही कोई सफलता प्राप्त नहीं कर सकता । अर्थात, परिश्रम से ही कार्य पूर्ण होते हैं । इससे सिद्ध होता है कि सफ लता करने के लिए हमें बार-बार अभ्यास एवं कठिन परिश्रम करने की आवश्यकता होती है । ठीक उसी प्रकार, जैसे रस्सी के बार-बार घिसने से पत्थर पर भी निशान बनजाता है ।

1. उपरोक्त गद्यांश का उचित शीर्षक दीजिए ?

2. कौन लगन और तपस्या की आँच में पिघलकर स्वयं को सोना बनाता है ?

3. कार्य कैसे पूर्ण होते हैं ?

4. जीवन की नींव कमजोर क्यों हो जाती है ?

5. परिश्रमी विद्यार्थी असफल होने पर क्या करते हैं ?

STATISTICS	STAP11	2017-18	B.A. (EMS) & B.Sc. (MSCS)

(Practical at end of first Semester)

SEMESTER - I

No. of credits : 1

PRACTICAL - I

	Title of the course :	
Course Outcome	**Course: STAP11** Upon successful completion of this course, students should have the knowledge and skills to:	**P.O Mapping**
CO 1	Obtain the basic knowledge of Excel like Data Entry, Editing, Save, Copying Import and Export of data.	PO7
CO 2	Analyze the data by using geographical representation.	PO6
CO3	Analyze the data by using diagrammatic representation.	PO6
CO 4	Applying the concepts of moments. Skewness and Kurtosis of real time data.	PO5
CO 5	Applying the concepts of measures of central tendency and dispersion of real life problems.	PO5

CO-PO MATRIX									
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
STAP11	**CO1**							**H**
	CO2						**M**	
	CO3						**M**	
	CO4					**H**		
	CO5					**H**		

1. Basics of Excel- data entry, editing and saving, establishing and copying a formulae, built in functions in excel, copy and paste and exporting to MS word document.
2. Graphical presentation of data (Histogram, frequency polygon, Ogives).
3. Graphical presentation of data (Histogram, frequency polygon, Ogives) using MS Excel
4. Diagrammatic presentation of data (Bar and Pie).
5. Diagrammatic presentation of data (Bar and Pie) using MS Excel
6. Computation of non-central and central moments – Sheppard's corrections for groupeddata.
7. Computation of coefficients of Skewness and Kurtosis – Karl Pearson's and Bowley'sand.
8. Computation of measures of central tendency, dispersion and coefficients of Skewness, Kurtosis using MS Excel.

List of Reference Books:

1. B.A/B.Sc. First Year Statistics(2010) , Telugu Akademi, Hyderabad.
2. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
3.Fundamental of Statistics, 2014, S.C.Gupta, Himalaya Publishing House

Structure of the Practical Examination

Semester I Internal examination for 50 marks
(i)   For Continuous evaluation – 10 Marks
(ii)   For examination – 40 Marks

STATISTICS	STAT11	2017-18	B.A. (EMS) & B.Sc. (MSCs)

SEMESTER – I   PAPER – I   No. of credits : 3

DESCRIPTIVE STATISTICS AND PROBABILITY

Objectives: The main objective of this course is to introduce Descriptive statistics and probability. By the end of the course students are expected to be able
(i)   to compute various measures of central tendency, dispersion, skewness and kurtosis.
(ii)   to distinguish between random and non-random experiments.
(iii) to find the probabilities of events.
(iv) to distinguish between unconditional and conditional probabilities
(v)   to obtain a probability functions and cumulative distribution functions of random variable (one or two dimensional) in the given situation.

Title of the course :		
Course Outcome	**Course: STAT11** Upon successful completion of this course, students should have the knowledge and skills to:	**P.O Mapping**
CO 1	Understand how to Apply the concepts of measurers of Central Tendency, Dispersion, moments, Skewness and Kurtosis	PO5
CO 2	Get the Knowledge of probability to Apply on various Uncertainity Situations.	PO6
CO3	Examining the Random Variables and it's properties to determine pmf and df	PO5
CO 4	Implement the concepts of Mathematical Expectation and Various Inequalities	PO6
CO 5	Classifying Various Generating Function and Applying them to Real life Problems	PO7

CO-PO MATRIX								
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
STAT 11	**CO1**					**H**		
	CO2						**M**	
	CO3					**H**		
	CO4						**L**	

		CO5									**M**

STATISTICS	STAT11	2017-18	B.A. (EMS) & B.Sc. (MSCs)

Unit I: Descriptive Statistics (12H)
1.1   Measures of central tendency:
     1.1.1   Mean, median, mode,
     1.1.2   Geometric mean and harmonic mean.
1.2   Absolute and relative measures of dispersion:
     1.2.1   Range, quartile deviation, mean deviation and
     1.2.2   Standard deviation.
 1.3 Moments:
     1.3.1   Central and
     1.3.2   Non-central moments,
     1.3.3   Importance of moments and
     1.3.4   their inter-relationships,
1.4   Sheppard's corrections for moments for grouped data.
1.5   Measures of skewness:
     1.5.1   Karl Pearson,
     1.5.2   Bowley's formula (based on quartiles) and
     1.5.3   Moments and
1.6   Kurtosis based on moments
1.7   Simple problems.

Unit II: Probability   (12H)
2.1   Probability:
     2.1.1   Basic Terminology in probability.
     2.1.2.   Mathematical,
     2.1.3   Statistical and
     2.1.4   Axiomatic definitions of probability with
     2.1.5   Merits and demerits.
2.2   Properties of probability based on axiomatic definition.
2.3   Conditional probability and
2.4   Independence of events.
2.5   Addition and
2.6   Multiplication theorems for n events.
2.7   Boole's inequality and
2.8   Bayes' theorem.
2.9   Problems on probability using counting methods and theorems.

Unit III: Random Variables (12H)
3.1   Random Variables:
     3.1.1   Definition of random variable,
     3.1.2   Discrete and
     3.1.3   Continuous random variables,
     3.1.4   Functions of random variables,
3.2   Probability mass function and
3.3   Probability density function with illustrations.
3.4   Distribution function and
     3.4.1   Its properties.

3.5   Transformation of one-dimensional random variable (simple 1-1 functions only).

3.6   Bivariate random variables,

       3.6.1   Joint,

       3.6.2   Marginal and

       3.6.3   Conditional distributions- Discrete and Continuous random variables,

       3.6.4   Its properties and

       3.6.5   Simple problems.

3.7   Distribution function of the bivariate random variables and

       3.7.1   Its properties.

3.8   Independence of random variables.

Unit IV: Mathematical Expectations (12H)

4.1   Definition**,**

4.2   Mathematical expectation of function of a random variable,

       4.2.1   non-central and central moments.

4.3   Properties of Expectations -

       4.3.1   Addition and

       4.3.2   Multiplication theorems of expectation.

4.4   Properties of Variance and

4.5   Covariance.

4.6   Cauchy-Schwartz Inequality.

4.7   Simple problems on mathematical Expectations

Unit V: Generating Functions (12H)

5.1Definition of moment generating function (m.g.f),

5.2   Cumulant generating function (c.g.f),

5.3   Probability generating function (p.g.f) and

5.4   Characteristic function (c.f) and

5.5   statements of their properties with applications.

5.6   Chebychev's Inequality and its applications.

5.7   Statement of Weak Law of Large Numbers and

5.8   Central Limit Theorem for identically and independently distributed (i.i.d) random variables with finite variance.

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Text Book: Fundamentals of Mathematical Statistics, 11th Edition, 2010,
                S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi

Unit I: Chapter 2   Section :   2.5-2.13.4, 2.15-2.15.3, 2.15.5, 2.16 - 2.16.1, 2.17.
Unit II:Chapter 3   Section :   3.3 - 3.5.1, 3.8 - 3.8.2, 3.8.5, 3.9 - 3.9.3, 3.10-3.15.2,
          Chapter 4   Section :   4.2.
Unit III:Chapter 5   Section:5.1- 5.4.3, 5.5- 5.5.6, 5.6.
Unit IV:Chapter 6   Section:6.2 - 6.6.1, 6.7,
Unit V   Chapter 7   Section:7.1, 7.1.2 - 7.1.3, 7.2, 7.2.1, 7.3, 7.3.1, 7.5, 7.7, 7.9,
        Chapter 9 Section:9.13 - 9.13.2.

List of Reference Books:

1.   B.A/B.Sc. First Year Statistics(2010) , Telugu Akademi, Hyderabad.

2.   Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .

3.   Probability and Statistics,Volume I, D.Biswas, New central book Agency (P) Ltd, New Delhi.

4.   An outline of Statistical theory, Volume two,3rd Edition,2010(with corrections) A.M.Goon,M.K. Gupta, B.Dasgupta ,The World Press Pvt.Ltd., Kolakota.

5.   Sanjay Arora and BansiLal:. New Mathematical Statistics, SatyaPrakashan ,New Delhi.

6.   Mathematical Statistics, 3rd edition, 2009, ParimalMukhopadhyay, Books &
        Allied(p) Ltd, Kolkata.

Model Paper Structure

        Section A: Eight questions are to be set, of these five questions are to be answered.
                                                    (5 x 5 = 25 M)
Section B:Two questions from each unit with internal choice. (5 X 10M = 50M)

Max Marks: 75M   **STAT11 : Model Paper**   **Pass Minimum: 30M**

SECTION - A   Max.Time :3h

Answer any FIVE of the following   5 x 5 = 25M
1.   Explain the concepts of skewness and kurtosis.
2.   Explain the terms conditional probability and independence of events.
3.   Define random variable and state its properties.
4.   Define the probability mass function and probability density function.
5.   Define characteristic function and state its properties.
6.   Define mathematical expectation and moment generating function of random
     variables.
7.   State and prove addition theorem of probability for two events.
8.   Explain in detail about. i) Joint, ii) marginal,

SECTION – B
Answer the following questions   5 x 10 = 50M

9.(a)   What do you understand by skew ness? How is it measured? Distinguish
        clearly, by giving figures, between positive and negative skewness.
                                    Or
  (b)   The first four moments of a distribution about the value of 4 are –1.5, 17, -30 and
        108. Find the moments about mean.
10.(a) State and Prove Baye's theorem.
                                    Or
   (b) A problem in statistics is given to three students A, B and C whose chances of solving
   it are ½, ¾
   and ¼ respectively. What is the probability that the Problem will be solved?
11.(a) State and Prove multiplication theorem on probability.
                                    Or
  (b)   The contents of urns I, II and III are as follows:
        1 White, 2 black and 3 red balls,   2 White, 1 black and 1 red balls, and 4 White, 5
        black and 3 red balls. One urn is chosen at random and two balls drawn from it.
        They happen to be white and red. What is the probability that they come from urn I.

12.(a) Define distribution function and state its properties.
                                    Or
.   (b) A random variable X has the following probability distribution.
        X=x   :   -2   -1   0   1   2   3
        P(X=x): 0.1   K   0.2   2k   0.3   3k
        Find i) K,   ii) evaluate   iii) Calculate mean and variance

13(a). State and prove addition theorem on mathematical expectation.
                                    Or
   (b) X,Y have joint pdf $f(x,y) = xe^{-x(y+1)}$; $x \geq 0, y \geq 0$ Find marginal and conditional
   pdf's
14 (a). State and prove Chebychev's inequality.
                                    Or

(b) If x is r.v. such that E(x) = 3 and E(x²)=13 use Chebychev's inequality to determine a lower bound for $P\left(-2 < x < 8\right)$

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Department of Telugu

Academic Year 2019-2020

Parvathaneni Brahmayya Siddhartha College of Arts and Science Vijayawada 520010
(An autonomous college in the Jurisdiction of Krishna University. Machilipatnam)

Course Code : TEL T11

COURSE NAME	COURSE OUT COMES NO	COURSE OUT COMES	PO NO.
B.A, BBA, BBA (BA) B.COM (GEN), B.COM (CA), B.SC(MPCS), B.SC(BZC), B.SC(MECS), B.SC(MSCA)	CO 1	విద్యార్థులు నైతికంగా మానసిక పరిపక్వాన్ని పొంది సమాజ శ్రేయస్సుకు దోహతపడగలరు	3
	CO 2	ఆధునికమైన భావజాలంతో సమాజంలో దురయ్యే సమస్యలని ఎదుర్కొంటూ జీవితంలో ముందుకు సాగగలరు	1
	CO 3	విషయాన్ని సులభంగా గ్రహించి వానిని తన జీవితానికి అనుగుణంగా మార్చుకుని ఉత్తమ మార్గం వైపు ప్రయాణించగలరు	1
	CO 4	గ్రహించిన పాఠ్యాంశాల ద్వారా మన జ్ఞానం ఎంతవరకు అనేది కొలబద్ధంగా నిలబడుతుంది	6
	CO 5	మాట్లాడే భాషలో స్పష్టత ఎదుట వ్యక్తితో మాట్లాడేటప్పుడు మాటల్లోనే ఆకర్షణీయత కలిగి దానికి శాస్త్ర సమ్మతిని జోడించి మరింత చేరువయ్యేందుకు ఉపయోగకరంగా ఉంటుంది	2

CO - PO MATRIX

Course Code : TEL T11

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1			M				
CO2	L						
CO3	L						
CO4						H	
CO5		L					

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Telugu	TELT11	2019-20	B.A,B.Sc,,B.Com,B.Com Computers, Appilications, B.Com E-commerce,BBA,BBABA,B.Com TPP,BCA

Semester -I   SYLLABUS   Credits: 3

అభ్యసన ఫలితాలు :

CO 1 :విద్యార్థులు నైతికంగా మానసిక పరిపక్వాన్ని పొంది సమాజ శ్రేయస్సుకు దోహదపడగలరు

 CO 2 :ఆధునికమైన భావజాలంతో సమాజంలో ఎదురయ్యే సమస్యలని ఎదుర్కొంటూ జీవితంలో ముందుకు సాగగలరు

CO 3 : విషయాన్ని సులభంగా గ్రహించి వానిని తన జీవితానికి అనుగుణంగా మార్చుకుని ఉత్తమ మార్గం వైపు ప్రయాణించగలరు

 CO 4 :గ్రహించిన పాఠ్యాంశాల ద్వారా మన జ్ఞానం ఎంతవరకు అనేది కొలబద్ధంగా నిలబడుతుంది

CO 5 : మాట్లాడే భాషలో స్పష్టత ఎదుట వ్యక్తితో మాట్లాడేటప్పుడు మాటల్లోనే ఆకర్షణీయత కలిగి దానికి శాస్త్ర సమ్మతిని జోడించి మరింత చేరువయ్యేందుకు ఉపయోగకరంగా ఉంటుంది

ప్రాచీన కవిత్వం

  1. గంగా శాంతనుల కథ   - నన్నయ

    (శ్రీ మహాభారతం ఆదిపర్వం నాల్గవ ఆశ్వాసం 120వ పద్యం నరవరుడగు   శంతనునకు

      సురవధికిని నుండి 165 వ పద్యం దివ్యభూషణాలంకృత వరకు)

  2. ద్రౌపతి పరివేదనం   -తిక్కన

    (శ్రీ మహాభారతం ఉద్యోగపర్వం తృతీయాశ్వాసం 100 వ పద్యం ధర్మనందను పలుకులు

      నుండి 125 పద్యం వరకు)

ఆధునిక కవిత్వం

  1.కన్యక   -గురజాడ అప్పారావు

  2. దేశ చరిత్రలు   -శ్రీశ్రీ

కథానికలు

  1. చింతలతోపు   -పాపినేని శివశంకర్

  2. సావు కూడు   - బండి నారాయణస్వామి

వ్యాకరణం

1.సంధులు :సవర్ణదీర్ఘ ,గుణ, యణాదేశ ,వృద్ధి ,అత్వ, ఇత్వా, త్రిక ,గసదవా దేశ ,రుగాగమా ,

ఆమ్రేడిత, సంధులు

2. సమాసాలు : తత్పురుష ,కర్మధారయ ,ద్వంద్వ ,ద్విగు , బహుప్రీహి సమాసాలు

    అక్షర దోషాలు: : దోషాలు సరిదిద్ది సాధురూపాలు రాయాలి సరిదిద్ది

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Telugu	TELT11	2019-20	B.A,B.Sc,,B.Com,B.Com Computers, Appilications, B.Com E-commerce,BBA,BBABA,B.Com TPP,BCA

Semester -I   MODEL PAPER   Credits: 3

1)ఈ క్రింది పద్యాలలో ఒకదానికి ప్రతిపదార్థ తాత్పర్య సహిత వ్యాకరణాంశాలను రాయండి   10M

1. అ)కని వనకన్యయో ధనుజ కన్యయో భుజగేంద్ర కన్యయో

    అనిమిష కన్యయో ఇది వియచ్చరకన్యయో అపూర్వ మీ

    వనకన్య కిట్టు లేకతను వచ్చునే మానవ కన్య యంచు న

    య్యనఘుడు   దాని చిత్తమున నాదట బోవక చూచె బ్రీతితోన్

 ఆ)వరమున పుట్టితిన్ భరతవంశంబు జో చ్చితి నందు పాండు భూ

    వరునకు కోడలైతి వ్యందుల పొందితి నీతి విక్రమ

    సిద్ధులకు పుత్రులను పడసితిన్ సహజనుల ప్రాపుగాంచితిన్

    సరసి జనాధ ఇన్నిట ప్రసస్తికి నెక్కిన దాన ఎంతయిన్ నెంతయిన్

2) ఈ క్రింది వానిలో రెండింటికి సందర్భా సహిత వ్యాఖ్యలు రాయండి   2X5 = 10M

  1. కుల గోత్ర నామము అడుగక దాని ఇష్టం సలుపుము

  2. కలకలనవ్వుచు వికంగ కాలంబయ్యెన్

  3. విద్యనేర్చినవాడు విపుడు

  4. మానవ కథ వికాసమెట్టిది

 3) ఈ క్రింది వానిలో రెండింటికి సమాధానాలు రాయండి   2X5 = 10M

  1.గంగా ప్రతీపుల వృత్తాంతాన్ని వివరించండి

  2. ద్రౌపతి పరి దేవనము ఆధారంగా తిక్కన కవితా లక్షణాలను విశ్లేషించండి

  3. కన్యక జనులను ఉద్దేశించి ఏమని పలికింది

  4. చీకటి కోణంలో పడిన ఎవరిని గురించి శ్రీ శ్రీ ప్రశ్నించాడు

4) గంగా శంతనుల కథ ఆధారంగా నన్నయ కవితా వైభవాన్ని రాయండి   10M

              (లేదా)

    ద్రౌపతి తన భంగపాటును కృష్ణునికి చెప్పిన విదమెట్టిది

5) కన్యక వృత్తాంతాన్ని తెలియజేయండి   10M

              (లేదా)

  గత చరిత్ర సారాన్ని శ్రీ శ్రీ విశ్లేషించిన విదమెట్టిది

6) చింతల తోపు కథలో వర్ణింపబడిన రైతుల కష్టనష్టాలను తెలియజేయండి   10M

              (లేదా)

  సావు కూడు కథను వివరించండి

7) ఈ క్రింది వానిలో మూడింటికి సంధి కార్యాలను రాయండి   3X2 = 6M

    1. గురూప దేశము   2.దేవర్షి   3. పిత్రాజ్ఞ   4.నిగ్గుతద్దము   5.ఇచ్చలు   6.చిట్టచివర

 8) ఈ క్రింది వానిలో రెండింటికి విగ్రహ వాక్యాలు రాసి సమాస నామాలు రాయండి   2X2 = 4M

    1.శీతోష్ణము   2.చరణ కమలములు   3.పద్మాక్షి   4.రామకృష్ణులు

9) ఈ క్రింది పదాన్ని సరిదిద్ది సాధురూపాలని రాయండి   5X1 = 5M

    1.పరుషం   2. మిత్రడు   3.బేధము   4.యేనుగు   5.పాలకుడు

CO – PO MATRIX

Course Code : TEL T01

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2	L						
CO3		L					
CO4		L					
CO5		L					

Telugu	TELT01	2019-20	B.A,B.Sc,,B.Com,B.Com Computers, Appilications, B.Com E-commerce,BBA,BBABA,B.Com TPP,BCA

SYLLABUS

semester –III & IV   credits: 3

అభ్యసన ఫలితాలు

CO 1 ప్రాచీన పద్యభాగం గత వైభవాన్ని ప్రవర్తనలను తెలియజేయడం వలన మన నాగరికత
సంస్కృతి తెలుసుకోవడానికి అవకాశం:

CO 2 : నూతన ఆలోచనలు కలిగి వాటిని వ్యక్తీకరించినట్లయితే దాని వలన ప్రయోజనం

 CO 3 : గ్రహించవలసినది సులభంగా గ్రహించి తన భావాల్ని వ్యక్తీకరించేందుకు
ఉపయోగపడటం

CO 4 :   భాషలోని లయ సౌందర్యం అవగాహన చేసుకుని ఆచరించేందుకు సహకరించటం

 CO 5: వినడానికి వినసంపైన మాటల పొందిగా ఇందులో కనిపిస్తుంది

ప్రాచీన కవిత్వం

1. వామనవతారం   -పోతన

 (శ్రీ మహా భాగవతం ఎనిమిదవ స్కంధం 582వ పద్యం నుండి 621)

2.శాలివాహన విజయం కొరవి గోపరాజు

(సింహాసనద్వాత్రింశికప్రథమ శ్వాసం 115 వ పద్యము నుండి 165 వ పద్యం వరకు)

3.ఆధునిక కవిత్వం

   హరిజన శతకము   -కుసుమ ధర్మన్న

    వంటిల్లు   -విమల

గద్యభాగం / వ్యాస సంపుటి

1. అభి వ్యక్తి నైపుణ్యాలు   - సుబ్బారావు

 2. వ్యక్తిత్వ వికాసం   -ఆచార్య రాచపాలెం చంద్రశేఖరరెడ్డి

వ్యాకరణం

చందస్సు : ఉత్పలమాల, చంపకమాల,, శార్దూలం, కందం, తేటగీతి ,ఆటవెలది ,సీసం

అలంకారాలు : శబ్దాలంకారాలు, ఉపమా ,,ఉప్రేక్ష, రూపక ,స్వభావక్తి ,అతిశయోక్తి ,

          అర్థాంతరన్యాసాలంకారాలు